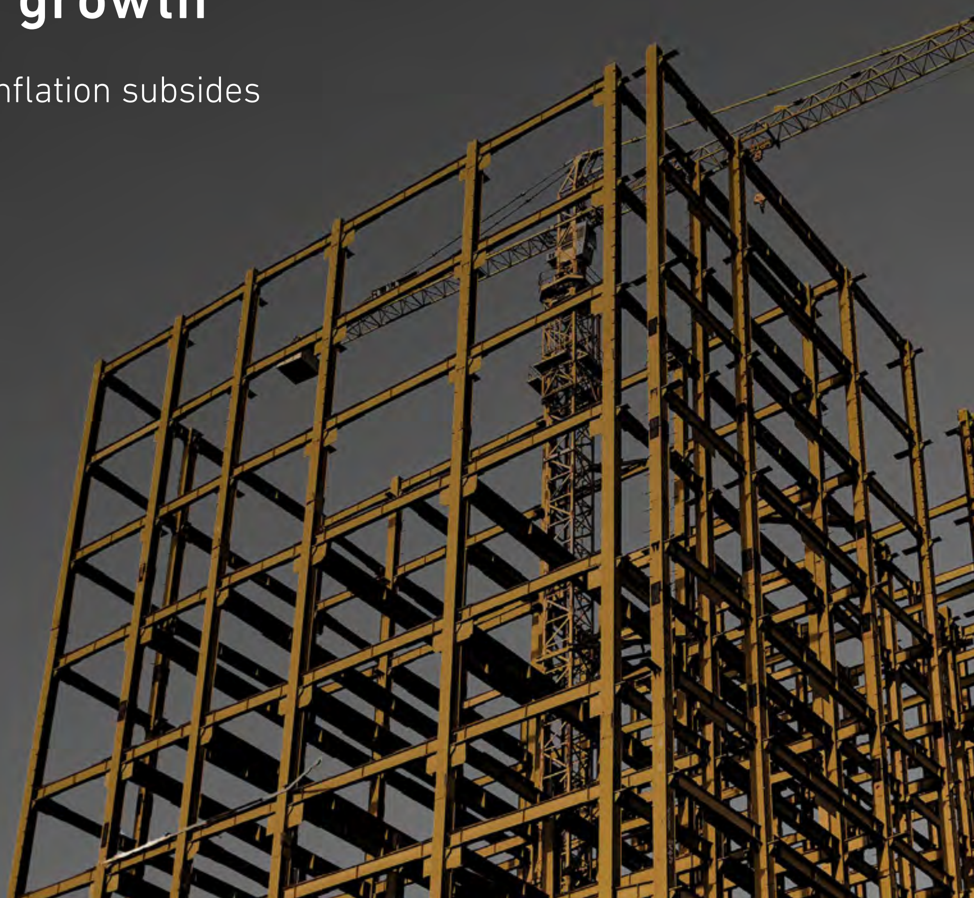
BTY

2023 MARKET INTELLIGENCE REPORT

Strong fundamentals support slower but steady growth

Escalation growth to ease as inflation subsides



BUILDING
INTELLIGENCE

BTY.COM

2022/2023 Highlights & The Year Ahead

We all work toward change for the better, even when – and perhaps especially when – the going gets tough.

In many ways what we learned responding to the pandemic prepared us for working steadily and resourcefully through the new challenges of 2022 – the increasingly severe impacts of climate change – and an inflationary spiral set in motion by global conflicts.

Through it all, we continue to help our clients and communities to build a better future, in part by expanding and enhancing our own capacity and reach. The past year saw the firm move into new offices in Vancouver, Montreal, and Ottawa to accommodate our growing workforce. It also saw BTY welcome a new addition to our family, Marshall & Murray, a leading cost consulting specialist. Together, we have created one of the largest and most experienced professional Cost Management practices in Canada.

Marshall & Murray's Managing Partner, Linn Marron summed up the logic – and benefits – of the new partnership, "Our firms have grown up on parallel paths, with BTY starting in Western Canada and Marshall & Murray in the East,' she says. "Our paths and strengths are converging to unlock new opportunities and enable us to build even greater success together."

That's what we continue to work for, no matter what the challenges: building greater success and a better future for our clients and the communities we serve – together.

Building Shared Success Comes from Winning as a Team

Winning as a team and championing shared success has always been at the heart of BTY's culture. We are proud of our teams coast to coast whose hard work and commitment to our clients, communities and each other remains fundamental to our firm's continued growth.

This is evident in the numerous awards and industry recognition our teams garnered in 2022, including BTY being awarded Employer of the Year by the Greater Vancouver Board of Trade, BTY named as the Technical Advisor of the Year by the P3 Awards, and being certified as a Best Workplace by Great Place to Work™ for the third consecutive year.

We also see ourselves as part of many teams all working together to make a better future. That engagement takes many forms in communities from coast to coast.

Our Indigenous Relations Program is developing positive and progressive relationships with Indigenous communities, businesses, organizations and stakeholders.

We are staunch supporters, active members, and regular sponsors of the Women's Infrastructure Network, and the Urban Land Institute's Women's Leadership Initiative.

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Cost Consulting specialist Marshall & Murray joins BTY Group of Companies

We are pleased to share that Marshall & Murray, one of Canada's leading Cost Consulting specialist firms, has joined the BTY Group of Companies, together creating one of the largest and most experienced professional Cost Management practices in the country.

Marshall & Murray was founded in 1982 with a focus on providing Cost Consulting and Project Controls expertise for public and private sector clients. With offices in Toronto, London (ON), and Ottawa, the firm has built a large portfolio of experience in healthcare, education, transportation, real estate, and public works, earning a loyal client base through its construction cost expertise and local market knowledge.

With this next step, Marshall & Murray will continue to serve clients maintaining the firm's team and legacy as part of the BTY Group of Companies, gaining additional resourcing and growth support, as well as BTY's expanded services in Project Management, Infrastructure Advisory, and Project Monitoring & Lender Services.

It is the combination of the trusted reputation with clients, local experts, and complementary sectors and markets, which set the case in motion for BTY and Marshall & Murray to come together.

Both firms also have a shared history going back to their respective founders, and value practicing and protecting an entrepreneurial culture of business growth and innovation when it comes to talent and leadership development.

SickKids Hospital, Toronto
Cost Management Services by Marshall & Murray
Master Scheduling, Risk Management, Performance Reporting and Advisory Services on "Project Horizon" by BTY Group

SkyTower at Pinnacle One Yonge
BTY Project Monitoring & Lender Services

Progressing Mega Infrastructure Projects and Demonstrating Industry Leadership

BTY's infrastructure mandates span sectors from district energy, high-speed broadband, and healthcare to aviation, water and wastewater treatment, and transit and transportation. 2022 was a busy year with more than 40 new projects in bid stage, 45 projects under construction, and 11 reaching significant operation milestones. Highlights from major projects that we are supporting which achieved financial close include, the USD $4 billion JFK Airport Terminal redevelopment in New York City, the $6 billion Ontario Line Subway Southern Civil, Stations and Tunnel Project in Toronto, and the $2.8 billion Ontario Line Rolling Stock, Systems, Operations and Maintenance Project. In addition to our team being named Technical Advisor of the Year for 2022, three projects for which BTY provided LTA services also won Gold at the P3 Awards, including The National Western Energy District, recognized as the Best Constructed Project; the P3 Schools Bundle 2, awarded Best Education and Higher Education Project; and the DC Smart Street Lighting Project, recognized as the Best Social Infrastructure Project.

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Supporting Clients in Monitoring and Mitigating Risks, and Unlocking New Opportunities

The swift, sharp rise in inflation over the past year compounded the impact of already high materials and labour costs, and supply chain challenges. BTY drew on the firm's long experience helping both lenders and builders manage risk in inflationary times, whether restructuring loans, substituting materials or establishing appropriate contingencies. Our deep due diligence and local knowledge assisted developers pausing on projects to get them shovel-ready for delayed launch dates. We also brought fresh insight into opportunities in regional markets and Indigenous-led projects from BC to Ontario. We are delighted to have assisted on over a thousand projects across North America, ranging from small refurbishments to some of the continent's tallest residential towers, and everything in between.

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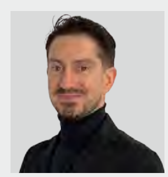

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Embedding Cost Expertise in Challenging Conditions

It was all hands on deck to help clients adapt to the rapid rise in materials costs over the past year across North America, working closely with them on navigating a complicated competitive landscape in which costs can differ dramatically by location and procurement type. Our professionals advised on locking in reasonable maximum price guarantees, thoroughly examined bids and subtrade selections, and provided analyses on the true cost impact of plan changes due to schedule delays and availability constraints. The teams also provided guidance on cost implications of working toward meeting net zero targets and integrating new energy efficient building technologies.

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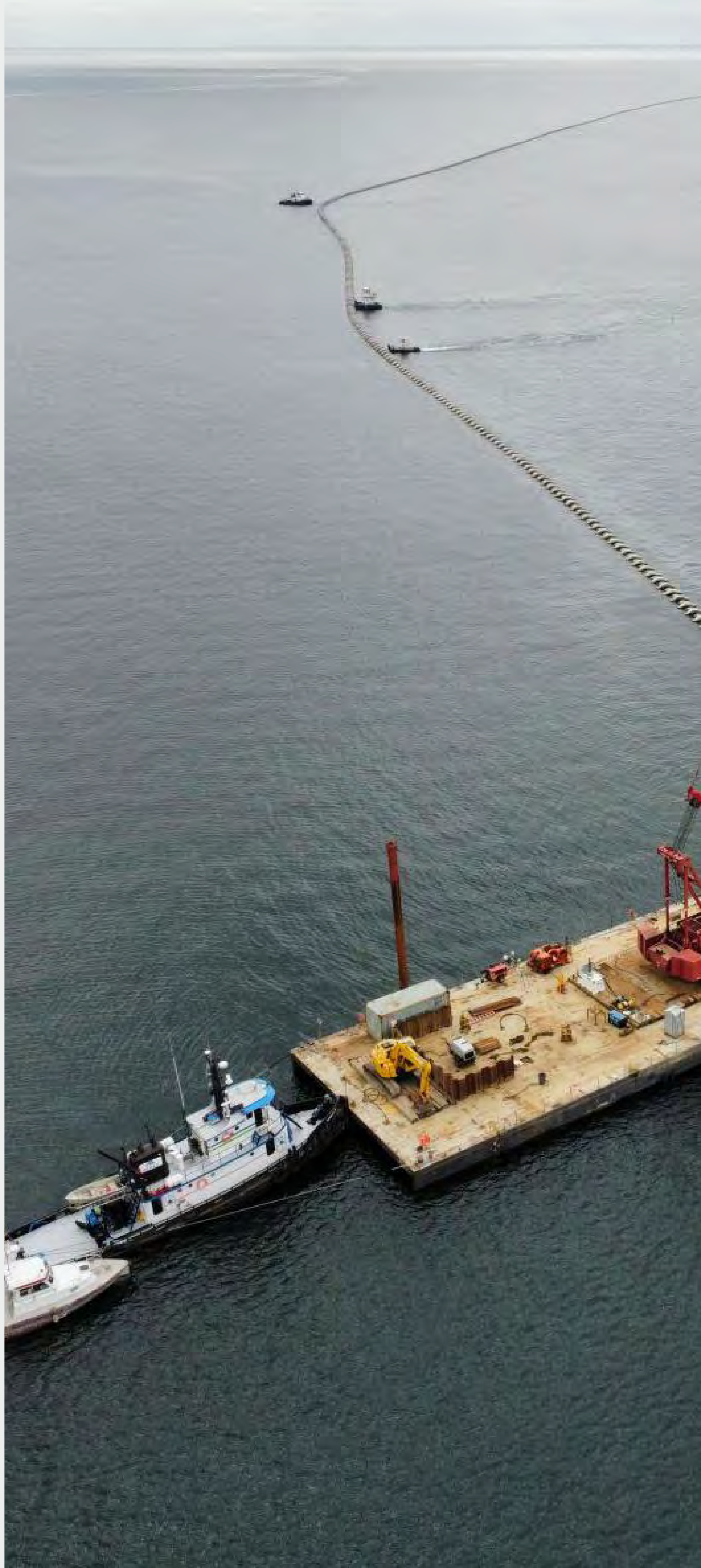

Enwave Deep Lake Water Cooling District System, Toronto
BTY Project Management Services

Driving Progress as Project Managers on Critical Energy and Community Projects

BTY is actively managing more than 70 projects across healthcare, education, and energy sectors from coast to coast. In the past year's high-inflation, high-cost environment, we advised clients on optimum procurement models best suited to their project's scope, size, risk profile, and location. We also enhanced reporting to provide additional due diligence and risk management as rising costs clashed with project budgets. Our engagements on Enwave Energy's Deep Lake Water Cooling Expansion, the Children's Hospital of Eastern Ontario 1Door4Care, the Saskatchewan Polytechnic Campus Redevelopment, and the Hospital for SickKids' Project Horizon, have our teams progressing critical projects through some of the most challenging market conditions Canada has faced in many decades.

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Canada's Construction Outlook 2023

Overview

Low Growth Scenario for 2023

High inflation, higher interest rates, materials cost, tight labour markets, and continuing supply chain challenges in 2022 started dragging down the country's robust pandemic recovery of 2021 – and pushed the economy into a low growth scenario for 2023.

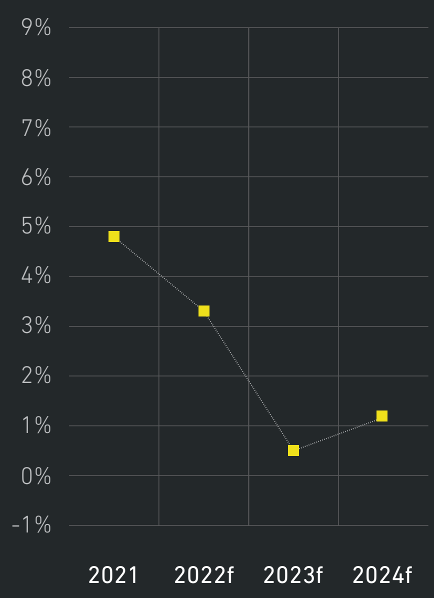
BC, Ontario, Manitoba, and Quebec are expected to post minimally positive GDP numbers, while the Prairie and Atlantic provinces are projected to see growth ranging from near 1% up to 1.6%. The national average could hover between 0.5 and zero.

Following the rapid and dramatic increases in interest rates, which the Bank of Canada has signaled it is prepared to continue if necessary, most analysts see rate hikes ultimately slowing down or holding steady over the second half of 2023. Inflation has come down from its 40-year record high, and as it continues to cool, the stage is set for renewed growth by the end of 2023. Canada's economic fundamentals remain sound despite the forecast contraction at the end of 2022 and into the first half of 2023.

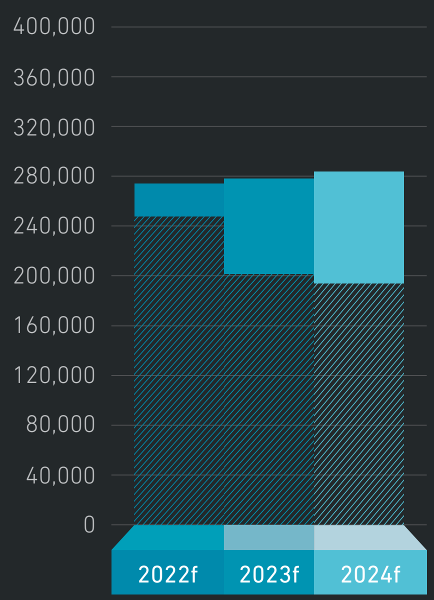
Immigration Helps Sustain Demand for Housing & Infrastructure

Increases in immigration will see Canada welcome nearly 1.5 million immigrants by 2025, keeping demand strong for new housing, schools, and healthcare facilities, as well as transportation and municipal infrastructure. Federal and multiple provincial governments have significantly increased infrastructure spending. These investments will help offset a projected decline in new residential building, which is expected to be especially sharp in BC, Ontario, and Quebec due in part to higher interest rates stressing already high levels of household debt.

REAL GDP CHANGE[1]

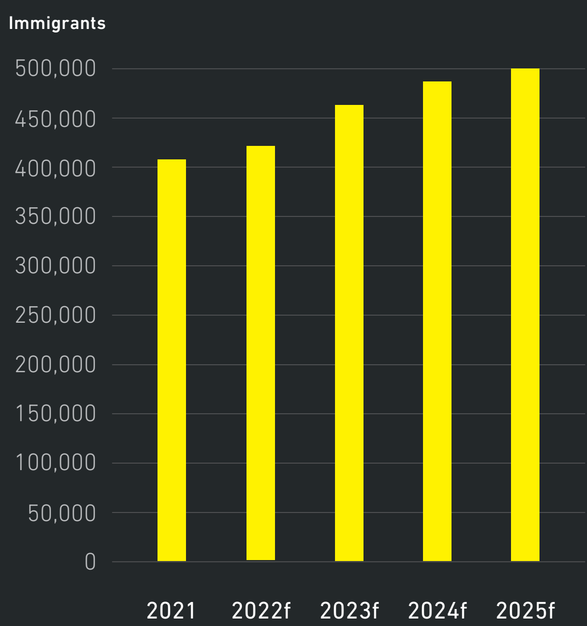


HOUSING STARTS



IMMIGRATION

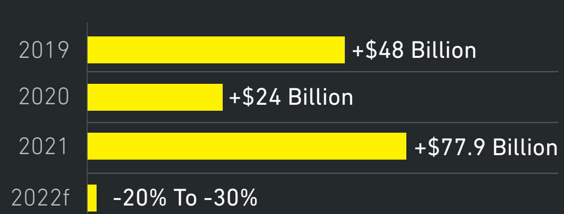
Actual and planned immigration targets[2]



Foreign Direct Investment in Canada

Foreign direct investment (FDI) in Canada in 2021 rose $77.9 billion to $1,082.5 billion. The rebound followed a $45 billion decline in 2020.[3] Canada now ranks third globally for FDI, and second in both OECD and G7 countries for FDI inflows.[4] The pace of increasing investment held firm for the first quarter of 2022, but began declining in the second quarter and is expected to continue the downward trend in 2023 in line with decreasing global FDI flows.[5]

FOREIGN DIRECT INVESTMENT



Additional Interest Rate Hikes May Be Needed to Combat Inflation

The Bank of Canada (BoC) raised its benchmark rate eight times since March 2022, when it stood at 3.25%. As of January, the rate was 4.5%, the highest since the 4% level seen in early 2008. The increases, intended to slow and reduce the rate of inflation, are also contributing to an economic contraction that the bank forecasts would extend into mid-2023.[6]

UPWARD PRESSURE

Interest rate increases
Oil and gas price rise
Higher materials cost
Higher inflation rate
Skilled trades shortages
Supply chain disruption

DOWNWARD PRESSURE

Risk of Recession
Cancelled or delayed projects

Sources: BTY Group Data Analytics, Statistics Canada, RBC, Scotiabank, BMO, CMHC

1 "Real gross domestic product growth, Canada, provinces and territories, 2021", Statistics Canada, November 2022
2 "An Immigration Plan to Grow the Economy", Government of Canada, November 2022
3 "Foreign direct investment, 2021", Statistics Canada, April 2022
4 "Invest in Canada, FDI Report 2021", Invest in Canada
5 "Global FDI forecast to decline further", FDI Intelligence, October 2022
6 "Bank of Canada raises interest rate again — but the pace of hikes may be slowing", CBC News, October 2022

Outlook by Province

Ontario

Record investment in the automotive sector – especially EV development – and robust infrastructure program will help balance residential slowdown.

British Columbia

Major projects keep construction levels high – and labour supply tight – as new homebuilding activity declines in this high-interest rate environment.

Alberta

Surging energy production and revenues – and new investment in both oil and gas and renewables – drive Alberta's return as a growth leader.

Saskatchewan

Higher prices for potash and agricultural output – and strong immigration-driven population growth – are supporting robust capital investment.

Manitoba

Major investments in infrastructure and agri-tech, and renewed post-pandemic immigration cushion the impact of contracting national economy.

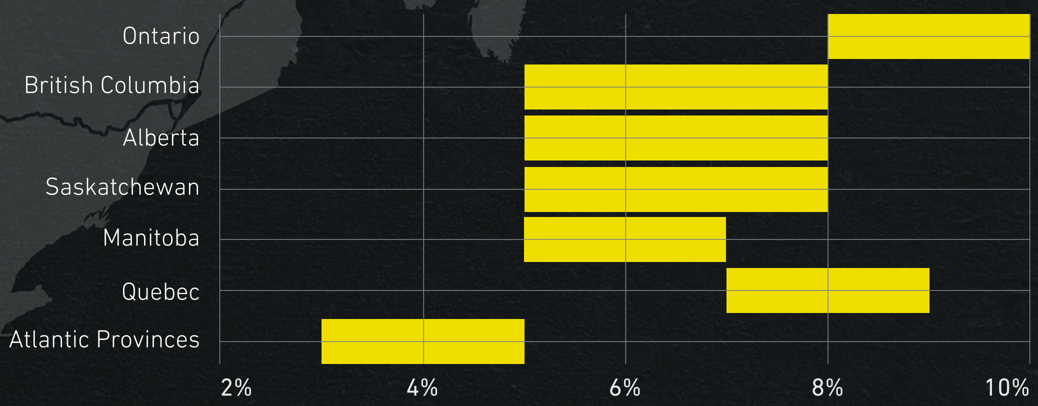
Quebec

Increased infrastructure investment in healthcare, education, and transportation will help temper expected decline in new homebuilding.

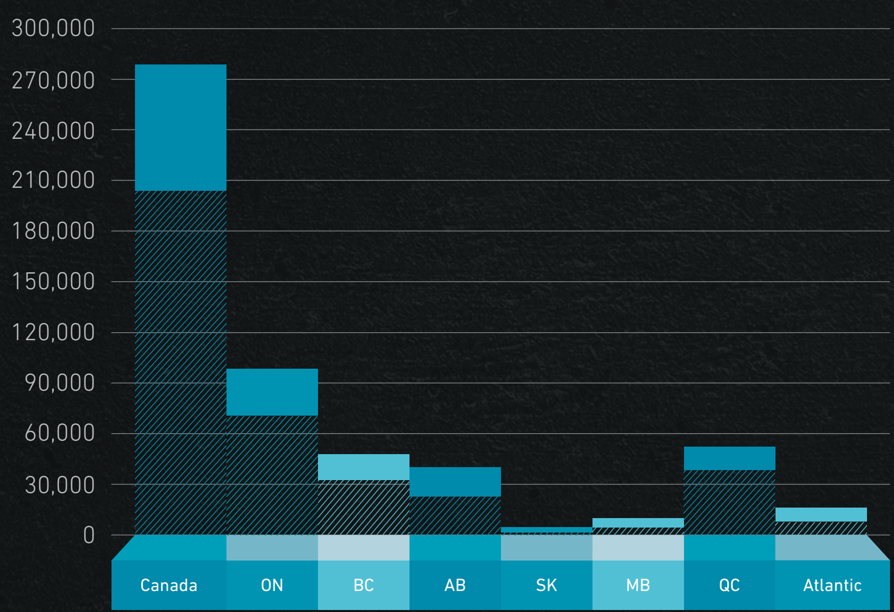
Atlantic Canada

International immigration and interprovincial migration buoy economies and growth prospects for Atlantic Provinces.

Canadian Escalation Forecast



2023 Forecast Housing Starts

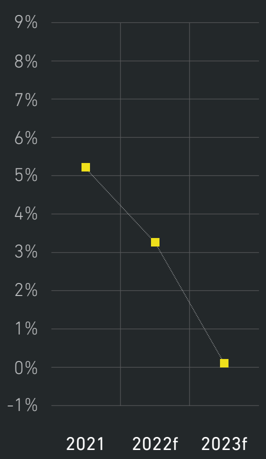


PROVINCIAL SNAPSHOTS

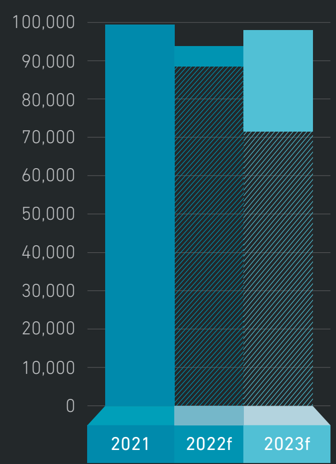
Ontario

Outlook

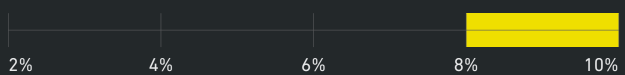
Real GDP Change



Provincial Housing Starts



Escalation Rate



Housing Starts by Urban Cities

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Toronto	41,898	45,109
Ottawa	10,221	11,032
Kitchener-Cambridge-Waterloo	5,602	4,847
Oshawa	3,863	3,775
Hamilton	4,187	3,530
London	5,592	3,361
St. Catharines-Niagara	2,635	3,168
Brantford	1,307	1,760
Windsor	1,458	1,515
Barrie	2,225	1,283
Kingston	1,371	653
Guelph	766	493
Belleville	524	372
Peterborough	624	353
Greater Sudbury	434	282
Thunder Bay	193	186

Strength in industrial and infrastructure to balance slowdown in residential

Higher interest rates, sharp drops in home sales, and to a lesser extent, decreases in Ontario house prices in 2022 failed to clip the brisk pace of homebuilding right into the early fall. But a decline in residential construction – with single-family bearing the brunt – is expected in 2023 as higher interest rates continue and a forecasted overall economic slowdown takes hold.

That decline should be somewhat tempered by renewed – and higher — immigration following the interruption from Covid-19. Ontario – and Toronto in particular – have long welcomed the lion's share of newcomers, with almost half settling in the province. Greater numbers are also now settling in more affordable urban centres including Oshawa, Kitchener, Waterloo, Cambridge, Barrie, and Ottawa.

Canada added some 405,000 new permanent residents to Canada in 2021, with a target of just over 430,000 for 2022.[7] Those numbers should help offset higher out-migration from Ontario in the past two years, due in part to Covid-19 and high housing costs. The immigration influx will also support demand for new housing in the GTHA as well as short- and long-term rental housing.

A post-Covid-19 office vacancy rate of just over 15% in mid-2022 – a 28-year high – and an 8.4% year-to-date decline in applications for building new office space is expected to slow development in that sector.[8]

New homebuilding to expand through inflationary cycle

Strong demand for new housing and commitment from both industry and government to build 1.5 million new units in the coming decade is expected to lift residential construction even through the current inflationary cycle. Housing starts in 2022 are expected to land just above 90,000. For 2023, the forecast ranges between 72,000 to over 97,000, depending on how long the economic slowdown lasts early in the year, and the impact of pricing corrections currently underway for existing stock.

Increased Investment in Automotive

While high-borrowing costs and weaker projected domestic and global growth also signal slow overall non-residential construction to an extent, substantial investment in the automotive sector, a prime engine of the provincial economy, will help offset residential and commercial declines. Nearly $16 billion in investments in the sector have been announced. These include a $3.6 billion commitment by Stellantis to expand its Windsor and Brampton plants, a $5 billion joint venture between LG Energy Solutions and Stellantis to create the first battery manufacturing plant in Canada[9], and a $1.38 billion commitment by Honda to upgrade its Alliston, Ontario, manufacturing plant.[10]

Big Boost to Infrastructure Spending in 2022-2023

An estimated $20 billion of Ontario's 10-year $158.8 billion capital spending plan for core infrastructure announced in the spring budget will be spent in 2022 and 2023. The plan allocates $25.1 billion for highways, $61.1 billion for public transit projects, $40 billion for hospitals and healthcare facilities, including $27 billion in capital grants, and $31 billion for schools, with $500 million put toward 37 school projects in 2022 and 2023.

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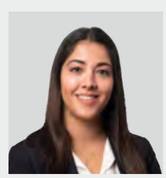

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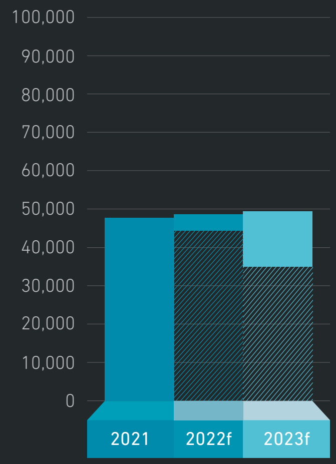
7 "Immigration, Refugees and Citizenship Canada Departmental Plan 2022-2023", Government of Canada, October 2022
8 "Improving Office Outlook Faces Risk of Recession", ConstructConnect, August 2022
9 "Stellantis and LG Energy Solution to Invest Over $5 Billion CAD in Joint Venture for First Large Scale Lithium-Ion Battery Production Plant in Canada", Stellantis, March 2022
10 "Honda plans $1.38B plant upgrade in Ontario, feds and province to invest millions", CityNews, March 2022

British Columbia

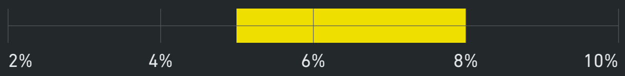
Outlook

Real GDP Change

Provincial Housing Starts



Escalation Rate



Housing Starts by Urban Centres

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Vancouver	26,013	25,983
Victoria	4,809	4,787
Kelowna	3,266	3,382
Abbotsford-Mission	1,078	1,467
Chilliwack	1,362	1,232
Nanaimo	1,084	1,184
Kamloops	690	522
Prince George	665	451
Courtenay	740	402

Major projects to sustain activity as pace of homebuilding slows

Rising interest rates and inflation are projected to clip the wings of BC's high-flying economy in 2023, with GDP declining from a forecast 3.0% in 2022 to 0.1% in 2023. Overall, the provincial economy will benefit from rising demand for natural gas, copper, nickel, and precious metals, all of which are expected to see substantial price increases. Natural gas production in the province increased 15% in the first half of 2022 compared to the same period in 2021.[11] A potential slowdown in homebuilding in the U.S. – a major importer of lumber – could be a drag on BC's exports.

A potential bright spot is the economic slowdown will cool labour demand modestly, which could be a welcomed bit of relief in the province's ultra-tight jobs market, especially in the construction sector.

The housing market correction that has taken hold across Canada will be felt more acutely in BC than in most provinces since activity in the residential sector accounts for a larger share of its economy – up to 10%.[12] After Toronto, Vancouver is the urban centre that attracts the most newcomers to Canada. With immigration ramping back up after a sharp drop due to Covid-19, the influx will help sustain demand for new homes and rental housing.

That demand will help support stability for the construction industry overall as some major projects, such as the Site C Dam and Kitimat LNG wind down before others, such as the George Massey Tunnel Crossing and Iona Wastewater Treatment Upgrade gear up.

In the interim, multiple large projects are hitting stride or starting construction, with the Vancouver area leading the way. Projects underway in the region include the Broadway SkyTrain extension, Pattullo Bridge Replacement, the Woodfibre LNG Plant, and St. Paul's Hospital Redevelopment, for which BTY provided Lenders' Technical Advisory services and will provide Construction Phase Project Monitoring services.

Other significant projects which BTY is supporting include the $540 million Sinclair Centre redevelopment, the $200 million Vancouver General Hospital Redevelopment, and the Senáḱw̓ development, a four-phase, 11-tower development that is the the largest First Nations project in Canadian history.[13]

A potential bright spot is the economic slowdown will cool labour demand modestly, which could be a welcomed bit of relief in the province's ultra-tight jobs market, especially in the construction sector.

That continued inflow of new residents will also buoy Metro Vancouver's office market, which enjoyed a much lower vacancy rate (9.4%) than the national average (16.2%) as of mid-2022. Construction on 29 buildings was underway in Vancouver in Q2 2022, but rising material and labour costs are causing many completion dates to be extended.[14]

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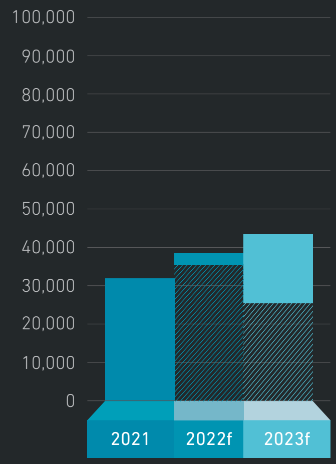
11 "Provincial Economic Forecast Provinces to Struggle Under the Weight of Higher Rates", TD Economics, December 2022
12 Ibid
13 "Senáḱw's past becomes a foundation for the Future", Kasian
14 "Vancouver leads nation in new office towers opening", Business In Vancouver, August 2022

Alberta

Outlook

Real GDP Change

Provincial Housing Starts



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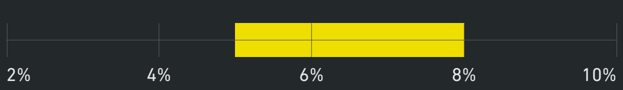

Housing Starts by Urban Centres

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Calgary	15,017	17,306
Edmonton	12,546	14,586
Lethbridge	639	816

Energy price surge spurs Alberta to lead Canada in growth

Rising oil and gas prices and increased production are fueling the province's long recovery and propelling it to become Canada's growth leader once again in 2022. The rising revenue flows are also supporting increased investment in other sectors. Alberta's 2022-2025 fiscal plan forecasts that non-energy spending would eclipse spending in the energy sector through 2025.[15]

Multiple projects that continue expansion in solar and wind power are forecast to lift Alberta's wind and solar capacity to almost 10 GW by 2023. That total is projected to nearly double by 2025 to almost 21 GW, representing an almost 50 per cent increase in Canada's renewable capacity – and making Alberta also Canada's top producer of renewable energy.[16]

Other sectors seeing a sharp rise in capital outlays that will boost construction spending include transportation, agricultural and communications infrastructure, and industrial and warehousing space. Both Calgary and Edmonton are seeing strong demand for logistics and distribution spaces.

Major projects include a $14.5 billion investment in infrastructure and operations by Telus in the next three years, including a broader deployment of its 5G network across the province, TC Energy's $1.5 billion expansion to the Nova Gas Transmission Line (NGTL) system, and Calgary International Airport's $490 million replacement and expansion of its airside maintenance centre.

More than $800 million invested over the past two years is flowing into a range of agricultural projects, including canola crushing and refining, greenhouse expansion, agri-technology, plant protein fractionation, and the processing of pulses, grain, cannabis, hemp and other food and beverage products.

The Alberta government has committed $40 million to kickstart 11 carbon capture projects in the province, providing funding for pre-construction studies for facility-specific opportunities that could yield significant future investments. Two ongoing commercial-scale carbon capture and storage projects, Quest and Alberta Carbon Trunk Line (ACTL) are supporting efforts to reach zero net emissions. BTY provided advisory services on the pioneering phase of ACTL, the world's largest carbon capture and storage project.

> Multiple projects that continue expansion in solar and wind power are forecast to lift Alberta's wind and solar capacity to almost 10 GW by 2023.

The economic resurgence and expanded job creation following Covid-19 recovery surge is also helping to increase population growth to 1.4% in 2022, with increasing levels of net migration from higher immigration and net gains from interprovincial migration. That influx will help sustain strong demand – and new home building – in the residential sector as it continues to recover – and drive new investment in education infrastructure.

Alberta's 2022-2025 fiscal plan also allocates $251 million for 15 projects for the construction of new schools and modernizations. BTY is providing Technical Advisory Services on Alberta High Schools, an ongoing $300-million project that bundles the development of five new high schools in different regions in a single project.

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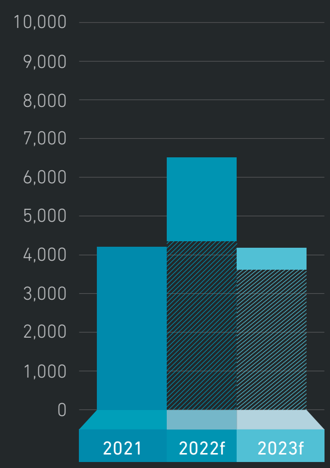
15 "Fiscal Plan Moving Forward, 2022-25", Government of Alberta, February 2022
16 "Alberta to lead the country in renewables boom", OilGasLeads, August 2022

Saskatchewan

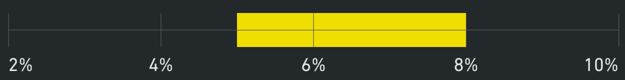
Outlook

Real GDP Change

Provincial Housing Starts



Escalation Rate



Housing Starts by Urban Centres

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Saskatoon	2,640	2,659
Regina	983	937

High commodity prices lift economy and spur strong capital investment

Like Alberta – with economic health more dependent on commodity prices – Saskatchewan is projected to outperform in 2022 and see less drag from the pullback expected in the national economy in 2023.

Buoyed by higher prices for its leading commodities – potash, wheat, and oil – Saskatchewan is projected to come second, or even eclipse Alberta in growth for 2022. Increasing global demand for food and fertilizer is driving investment in new mines. Stage 1 construction – valued at $7.5 billion – of the Jansen potash mine is underway[17], with two other multibillion-dollar potash projects in the design stage.[18]

Major global agri-businesses are also investing heavily with more than $1 billion committed to building and expanding four new canola processing facilities, driven in large part by increasing demand for vegetable oil as feedstock for the production of renewable diesel.[19]

Ongoing large infrastructure projects include the $825 million Great Plains Power Plant in Moose Jaw, the $222.8 million Buffalo Pound Water Treatment Plant, and the $450 million Victoria Hospital expansion in Prince Albert, for which BTY is providing advisory services. The infrastructure pipeline features the Covid-delayed construction of Saskatoon's bus rapid transit system, the $4 billion Saskatoon Freeway project, and a three-phase, 10-year plan in 2020 to irrigate up to 500,000 acres of land that will more than double the irrigable land in Saskatchewan.

BTY is also advising on two Indigenous projects close to Saskatoon. The first is Kahkewistahâw Landing, an urban reserve near the airport with a commercial development built and operated by the First Nation that will include office buildings, industrial storage, a hotel, medical centre, and commercial retail. The second is the Grasswood wastewater treatment plant project being undertaken by the English River First Nation.

Immigration propels population growth

Strong population growth over the past five years has seen the province's population reach 1.2 million in the 2021 census, with a projected 1.1% growth rate in 2022. International immigration has been the main driver, more than offsetting interprovincial outmigration.[20]

> Saskatchewan had the second-highest number of urban housing starts among the provinces in mid-2022, with building construction increasing by 63% in the same time frame, the highest in the country.

The influx should help ease tight labour markets resulting from increased investment across multiple sectors. Saskatchewan had the second-highest number of urban housing starts among the provinces in mid-2022, with building construction increasing by 63% in the same time frame, the highest in the country.[21] The overall residential forecast calls for a slight decline in 2023, but far less than the national average.

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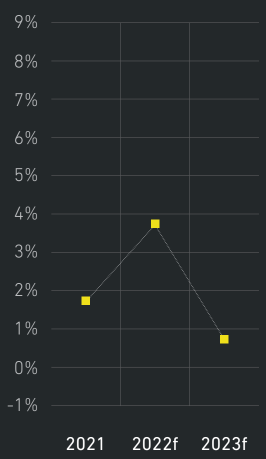
17 "Jansen Project", Mining Data Online, October 2022
18 "Top 10 major upcoming Atlantic and Manitoba, Saskatchewan construction projects - Canada - May 2022", Daily Commercial News, May 2022
19 "Ceres to invest $350 million in canola crush plant", World Grain, May 2021
20 "12.5 per cent of Sask. population is now immigrants: 2021 census", CBC News, October 2022
21 "Saskatchewan Housing Starts Continue Strong Growth in July 2022", August 2022

PROVINCIAL SNAPSHOTS

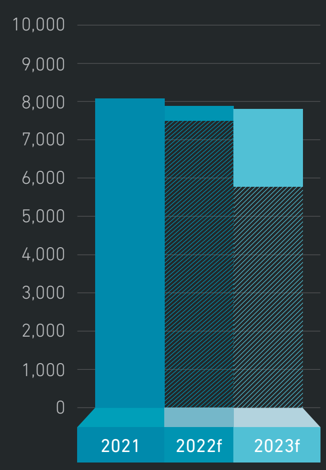
Manitoba

Outlook

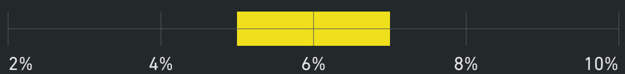
Real GDP Change



Provincial Housing Starts



Escalation Rate



Housing Starts by Urban Cities

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Winnipeg	5,694	5,870

Major infrastructure investment supports healthy construction levels

Manitoba has benefited from a strong economic performance in 2022 led by robust agricultural production. Recent investment in food processing capacity for in-demand commodities such as canola – now enjoying elevated prices – will help cushion an anticipated downturn across the country in 2023.

While these exports are thriving, Manitoba is also experiencing renewed growth in international immigration that is helping to offset interprovincial outmigration – and on track to post the highest rate in the province since 1971.[22] The relative affordability of real estate in the province had attracted out-of-province buyers, but interprovincial moves were largely driven by remote work lifestyle changes due to the pandemic.

International in-migration is expected to rise again in 2022, with Manitoba having issued 10,000 invitations through its Provincial Nominee Program in 2021. The influx of newcomers is expected to support housing demand and temper a slight decline in projected housing starts in 2023 after strong showings in 2021 and 2022.

As elsewhere across the country, higher inflation and borrowing costs are expected to dampen overall economic activity. New investment in infrastructure as well as ongoing major projects will help keep construction activity levels healthy.

The largest ongoing project is the $1.85 billion upgrade of the North End Sewage Treatment Plant Project in Winnipeg. The first part, costing $473 million, started in 2021 with completion scheduled for 2025. The second is a new biosolids plant budgeted at $828 million and slated to start by 2024 and built out over six years.[23]

In spring 2022, the provincial government announced $812 million capital investment toward building, expanding, and renovating healthcare facilities across the province.

The largest project is a new $283 million hospital in Portage la Prairie. A second new hospital estimated at $127 million will be built in Neepawa, 300 km northwest of Winnipeg.

The government also released its 2022 Multi-Year Highways Investment Strategy, a guide for strategic infrastructure investments. The main priority spending areas elements are Trade and Commerce routes that will stretch 7,112 kilometres, or just over one-third of Manitoba's all-weather provincial road network, and the Perimeter Highway, a 90-km ring road for through-traffic around Winnipeg.[24]

The long-planned Kapyong Barracks redevelopment, a $1.2 billion mixed-use master-planned project, took a major step forward in 2022 with an agreement that Treaty One Nation will develop the site in conjunction with the Canada Lands Corporation (CLC). Treaty One Nation will develop 68 per cent of the lands, with CLC developing the remaining 32 per cent.[25]

At full completion, the 160-acre development project will represent the largest multi-use project in modern Winnipeg history and the single largest, strategically located urban Indigenous economic zone in Canada.[26]

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22 "Economic Outlook and Review, Budget 2022", Government of Manitoba
23 "Winnipeg's $1.8B North End sewage treatment project redefines complexity", Journal of Commerce, August 2022
24 "Manitoba government releases first transportation infrastructure strategy", Journal of Commerce, August 2022
25 "Winnipeg reaches agreement to provide municipal services for Kapyong Barracks redevelopment", CTV News, June 2022
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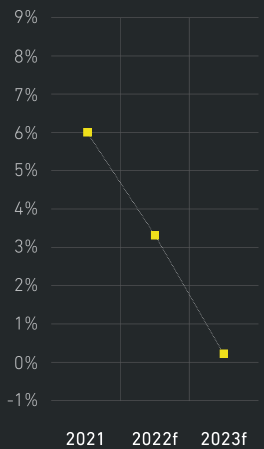
PROVINCIAL SNAPSHOTS

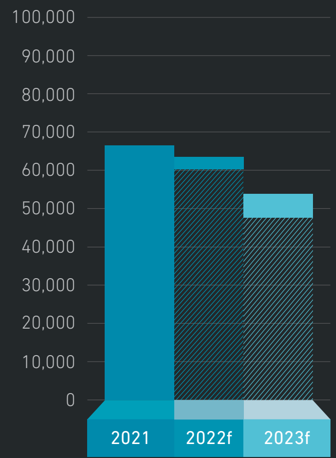
Quebec

Outlook

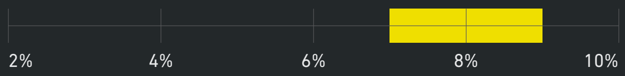
Real GDP Change



Provincial Housing Starts



Escalation Rate



Housing Starts by Urban Centres

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Montréal	32,343	24,149
Québec City	9,389	8,290
Gatineau	3,059	3,991
Sherbrooke	2,601	1,751
Trois-Rivières	1,081	1,153

Increased infrastructure investment to balance decline in residential building

The outlook for construction in Quebec is for a sizeable drop in housing starts after record high performance in 2021 and 2022, with strong investment in infrastructure tempering the decline.

Rising borrowing costs, supply shortages, and higher material costs will have the greatest impact on single-family homes, with a lesser drag on more affordable options such as row houses and condominiums and home renovation. Lower population growth may also be slowing residential construction in the interim. Since 2018, Quebec has been accepting a proportionately lower level of immigrants relative to most provinces, limiting numbers to 50,000 a year since 2018. Immigration drives population growth in almost all provinces.

While some projects have been postponed or canceled, developers with sound balance sheets are moving ahead. Even with the decline in residential, skilled labour supply is expected to remain tight, and materials costs high.

Infrastructure development is expected to be a stabilizing factor for the construction sector, buoyed by the provincial government's sustained high level of investment over the past several years. The most recent infusion came in new spending announced for the 2022-2032 Québec Infrastructure Plan, which added another $9 billion to make a record total $142.5 billion allocation for the longer term. Over the last four years alone, public infrastructure investments have grown by $42.1 billion.[27]

In 2022-2023, $2.8 billion will go into constructing seniors' residences, rebuilding outdated residential and long-term care centres, and upgrading and redeveloping hospitals. Among the larger healthcare projects is the 404-bed Vaudreuil Hospital just west of the island of Montreal near Dorion. BTY is providing Independent Certifier Services on that project as well as Project Management services for nine senior homes in Laval, Laurentides, and Lanaudière Senior Homes.

An estimated $1.2 billion is allocated to continuing and completing projects to increase classroom space, with nearly $800 million dedicated to expanding and renovating higher-education institutions. Road infrastructure will receive $4.4 billion, with an additional $2.1 billion to improve public transit (including electrification).

Among the largest projects in this category are the Reseau Express Metropolitain (REM), the largest public transit project in Quebec in more than 50 years; other major transportation undertakings are the extension of the Montreal Metro Blue Line and the Quebec-Levis Tunnel project.

In the economic rebound from 2020 the industrial sector surged in 2021 and the first half of 2022 with Quebec attracting more electric vehicle manufacturing and EV battery development. Relatively lower cost electricity and an abundance of natural elements used in EV battery manufacturing as well as strong government support helped build new investment. The low-cost power has also seen an uptick in the construction of data centres. However, an overall labour shortage that is slowing activity in manufacturing is said to be responsible for a $7 billion loss to the provincial economy.[28]

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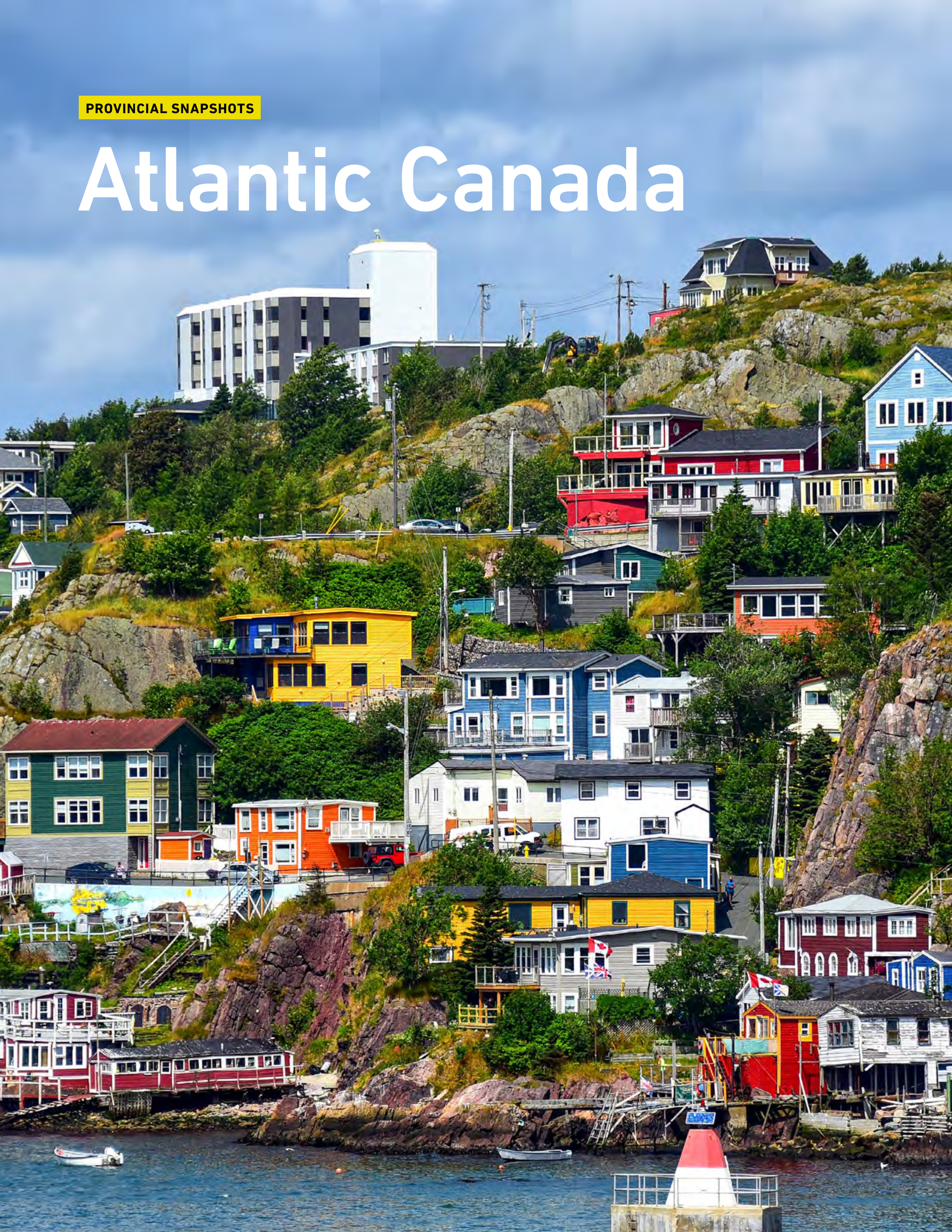
27 "2022-2023 Expenditure Budget - Building Québec's Future and Sustaining its Economic Growth: $9 Billion More in the Expenditure Budget", Government of Quebec, March 2022
28 "Quebec lost $7 billion last year due to labour shortage in manufacturing sector, group says", CTV News, November 2022

PROVINCIAL SNAPSHOTS

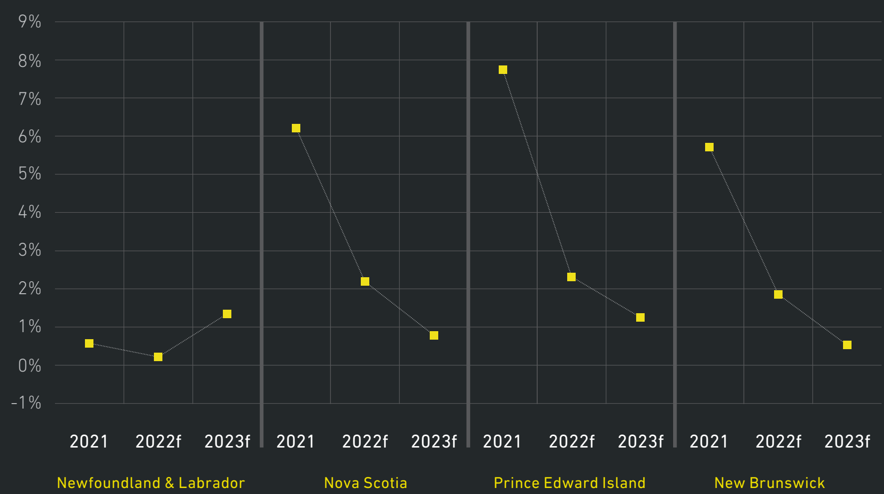
Atlantic Canada



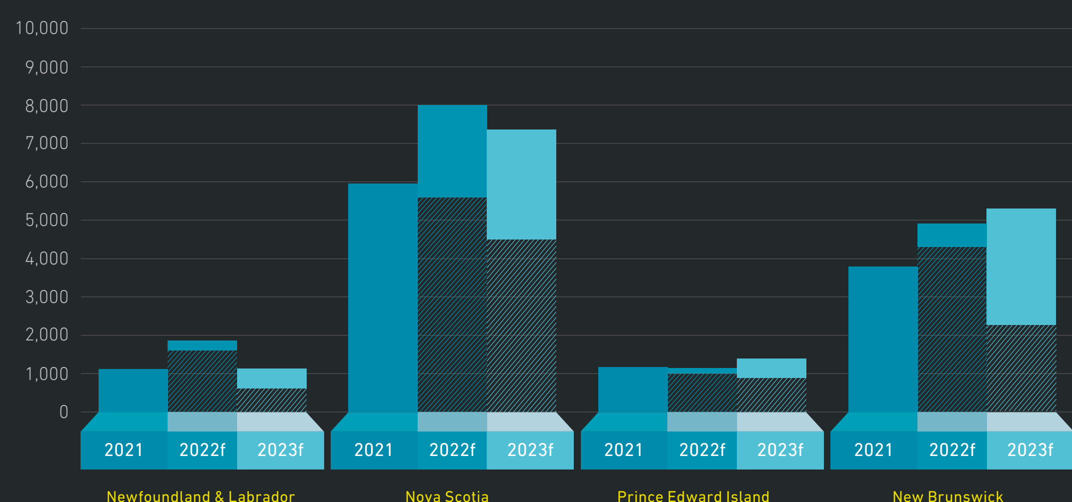
Both international immigration and interprovincial migration lift Atlantic Provinces' performance

Over the past 15 years, the share of immigrants to Canada who are settling in the region has tripled, rising from 1.2% to 3.5% in 2021. Nova Scotia and New Brunswick are seeing the biggest growth in immigration, with steady increases between 2016 and 2021.[29] The influx brought a surge in residential building in 2021 and 2022 that will moderate as higher interest rates and materials cost slow activity in 2023 – but to a lesser degree than in Central Canada and BC. Atlantic Canada also looks to be retaining gains in population growth stemming from interprovincial migration linked to increased work-from-home capabilities and the diversification of their economies.[30]

Outlook



Provincial Housing Starts



29 "Atlantic provinces see rapid growth in immigration, Census figures show", CBC News, October 2022
30 "Provincial outlook: Where are the headwinds strongest?", CIBC Capital Markets, October 2022
31 "Capital Plan 2022-23", Government of Nova Scotia, March 2022

New Brunswick

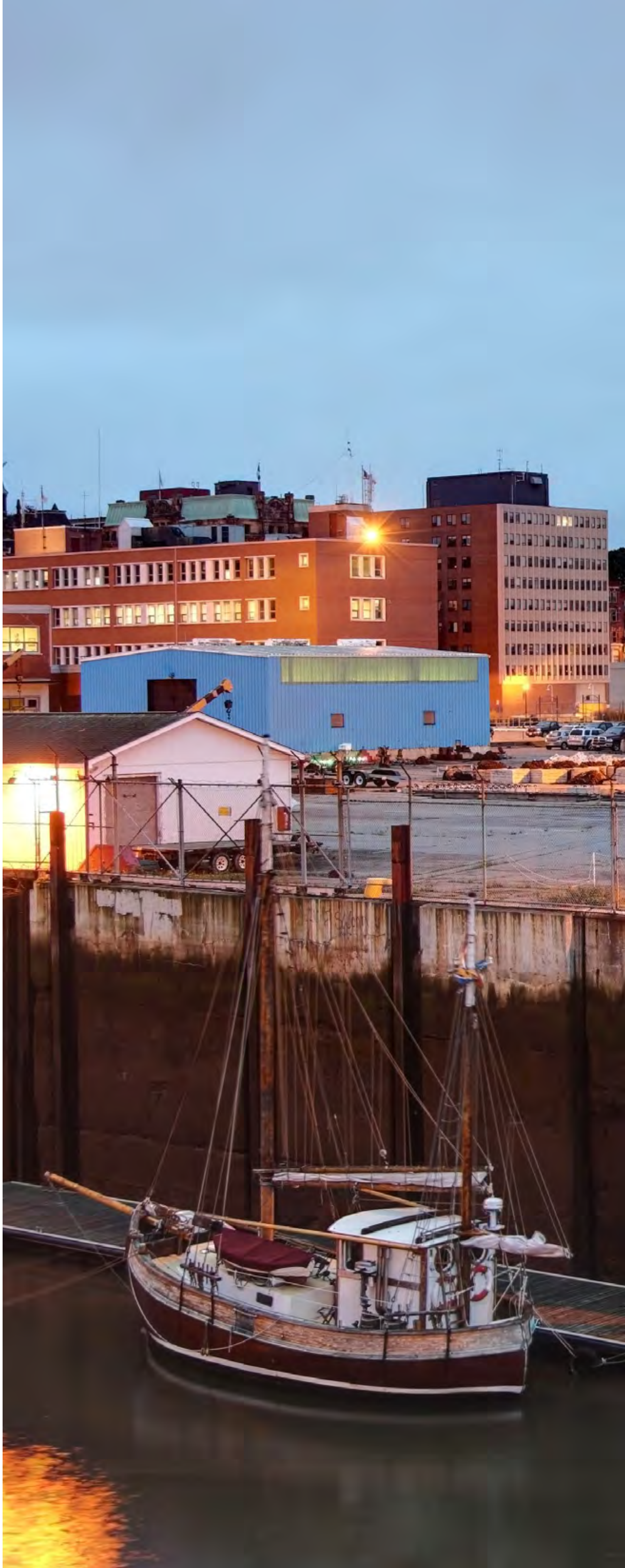
The expected general economic pullback for the national economy will take hold in New Brunswick in 2023, lowering both GDP and housing starts even as immigration fuelled population growth continues. Slumping lumber prices due partly to a downturn in U.S. homebuilding, and an anticipated decline in oil and gas production due to decommissioning of wells are expected to drag down the provincial economy. Major projects include the $300 million Atlantic Science Enterprise Centre, with construction expected to start in 2023, the ongoing modernization of the Port Saint John container terminal, and a proposed new treatment operation at the Irving Pulp and Paper Mill in St. John.[31]

Nova Scotia

Nova Scotia appears to be well-positioned to sidestep the impact of a national economic contraction. Buoyed by immigration and in-migration driven population growth, building investment was up 20% in 2022 over 2021. Industrial and commercial construction were strong performers, with the residential sector expected to experience only a slight dip in housing starts compared to the rest of the country. The provincial government's 2022-2023 capital plan totals $1.58 billion, with $464.6 million allocated for healthcare redevelopment projects (QEII & CBRM), $508 million for highway improvement, $175.3 million to build and renovate schools, and $122.6 million for construction, repair and renewal and other health projects.[32]

Prince Edward Island

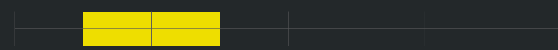
PEI had the strongest population growth of any Canadian province in 2020 and 2021.[33] With continued strong growth expected and a robust economic recovery led by renewed potato exports, tourism, manufacturing of wind turbines and propellers, the province is expected to fare much better than others in a national downturn. The uptick in population is sustaining strong activity in construction, with increased external investment and capital spending on new facilities in the bioscience sector, which saw exports rise by 23 percent in 2021 and, with revenues forecast to reach $500 million by 2025.[34]



32 Ibid
33 "The 2021 economic overview for PEI", Employment Journey, January 2022

Outlook (cont.)

Escalation Rate



Housing Starts by Urban Centres

2021 YTD vs. 2022 YTD

	2021 YTD	2022 YTD
Halifax	3,794	3,387
Moncton	1,746	2,028
St. John's	544	733
Charlottetown	815	684
Saint John	461	608

Newfoundland & Labrador

Going against the general economic flow, the province is projected to see stronger economic growth in 2023 after a weak showing in 2022. While overall lower production had offset the benefit of higher oil prices, approval of Bay du Nord offshore oil megaproject, the restart of the $3.2 billion West White Rose oilfield expansion, and a return to production for two facilities should help boost the economy.[35] The mining industry is also expanding with construction of the new Valentine Lake gold mine expected to start in 2022 or early 2023. Like other Atlantic Provinces, continued population growth during 2021 and 2022 is driven by immigration and in-migration that help to sustain housing demand.

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34 Ibid
35 "West White Rose offshore oil project is back on, leaving climate concerns in its wake", Canada's National Observer, June 2022

Cost Data Parameters 2023 Forecast

PROJECT CATEGORY	BRITISH COLUMBIA				ALBERTA			
	ACTUAL 2022		FORECAST 2023		ACTUAL 2022		FORECAST 2023	
	$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft
HEALTHCARE								
Residential Care	5,750 - 7,480	534 - 695	6,210 - 8,080	577 - 751	4,660 - 6,660	433 - 619	4,920 - 7,030	457 - 653
Ambulatory Care	9,200 - 10,350	855 - 962	9,940 - 11,180	923 - 1,039	8,330 - 9,990	774 - 928	8,790 - 10,540	817 - 979
Acute Care	10,350 - 11,500	962 - 1,068	11,180 - 12,420	1,039 - 1,154	8,880 - 11,100	825 - 1,031	9,370 - 11,710	871 - 1,088
LABORATORIES								
Research Laboratories	9,680 - 10,650	899 - 989	10,450 - 11,500	971 - 1,068	7,460 - 8,290	693 - 770	7,910 - 8,790	735 - 817
Teaching Laboratories	7,740 - 8,480	719 - 788	8,360 - 9,160	777 - 851	6,090 - 7,100	566 - 660	6,460 - 7,530	600 - 700
Animal Research	11,810 - 13,030	1,097 - 1,211	12,750 - 14,070	1,185 - 1,307	8,880 - 9,720	825 - 903	9,410 - 10,300	874 - 957
HIGH-RISE RESIDENTIAL								
Rental Units	3,810 - 4,440	354 - 412	4,000 - 4,660	372 - 433	2,720 - 3,250	253 - 302	2,750 - 3,280	255 - 305
Market Units Mid End Specifications	4,410 - 5,000	410 - 465	4,630 - 5,250	430 - 488	2,940 - 3,580	273 - 333	2,970 - 3,620	276 - 336
Market Units High End Specifications	4,940 - 6,180	459 - 574	5,190 - 6,490	482 - 603	3,010 - 3,930	280 - 365	3,040 - 3,970	282 - 369
LOW-& MID-RISE RESIDENTIAL								
Rental Units	2,720 - 3,470	253 - 322	2,860 - 3,640	266 - 338	1,700 - 2,420	158 - 225	1,770 - 2,520	164 - 234
Market Units Mid End Specifications	2,990 - 4,820	278 - 448	3,140 - 5,060	292 - 470	2,410 - 2,780	224 - 258	2,510 - 2,890	233 - 268
Market Units High End Specifications	4,320 - 5,390	401 - 501	4,540 - 5,660	422 - 526	2,490 - 3,430	231 - 319	2,590 - 3,570	241 - 332
TOWNHOUSES (WOOD FRAME)								
Rental Units	2,040 - 2,560	190 - 238	2,140 - 2,690	199 - 250	1,260 - 1,680	117 - 156	1,310 - 1,750	122 - 163
Market Units Mid End Specifications	2,580 - 4,420	240 - 411	2,710 - 4,640	252 - 431	1,430 - 1,980	133 - 184	1,490 - 2,060	138 - 191
Market Units High End Specifications	3,210 - 4,650	298 - 431	3,370 - 4,870	313 - 452	2,340 - 2,520	217 - 234	2,430 - 2,620	226 - 243
SHOPPING CENTRES								
Strip Plaza	1,360 - 3,320	126 - 308	1,430 - 3,490	133 - 324	1,590 - 2,970	148 - 276	1,650 - 3,090	153 - 287
Enclosed Mall	3,160 - 4,530	294 - 421	3,320 - 4,760	308 - 442	2,610 - 3,330	242 - 309	2,710 - 3,460	252 - 321
Anchor/Department Store	2,770 - 3,360	257 - 312	2,910 - 3,530	270 - 328	2,440 - 3,080	227 - 286	2,540 - 3,200	236 - 297
Supermarket	2,160 - 2,860	201 - 266	2,270 - 3,000	211 - 279	1,980 - 2,320	184 - 216	2,060 - 2,410	191 - 224
Discount Store	1,680 - 2,420	156 - 225	1,760 - 2,540	164 - 236	1,370 - 1,920	127 - 178	1,420 - 2,000	132 - 186
OFFICE								
Under 5 Storeys	2,720 - 3,300	253 - 307	2,860 - 3,470	266 - 322	3,690 - 4,090	343 - 380	3,820 - 4,230	355 - 393
5 - 10 Storeys	3,210 - 4,180	298 - 388	3,370 - 4,390	313 - 408	2,530 - 3,240	235 - 301	2,620 - 3,350	243 - 311
10 - 20 Storeys	3,430 - 4,570	319 - 425	3,600 - 4,800	334 - 446	2,620 - 3,380	243 - 314	2,710 - 3,500	252 - 325
20 - 30 Storeys	4,410 - 5,510	410 - 512	4,630 - 5,790	430 - 538	2,970 - 4,220	276 - 392	3,070 - 4,370	285 - 406
EDUCATIONAL								
Elementary Schools	2,830 - 3,960	263 - 368	3,060 - 4,280	284 - 398	3,320 - 3,540	308 - 329	3,470 - 3,700	322 - 344
Secondary Schools	3,210 - 4,350	298 - 404	3,470 - 4,700	322 - 437	3,540 - 4,000	329 - 372	3,700 - 4,180	344 - 388
Higher Education	5,440 - 7,150	505 - 664	5,880 - 7,720	546 - 717	4,690 - 4,920	436 - 457	4,900 - 5,140	455 - 478
LIGHT INDUSTRIAL								
Warehouse	1,310 - 2,100	122 - 195	1,400 - 2,250	130 - 209	1,260 - 2,280	117 - 212	1,310 - 2,370	122 - 220
HOTELS								
Low Rise	3,260 - 4,400	303 - 409	3,420 - 4,620	318 - 429	2,180 - 2,610	203 - 242	2,260 - 2,700	210 - 251
ROADS - PAVING	$/Lane km		$/Lane km		$/Lane km		$/Lane km	
Paved Highway - Linear Roadworks	1,335,700 - 1,670,300		1,375,800 - 1,720,400		1,122,100 - 1,377,100		1,155,800 - 1,418,400	
ROAD OVERPASS BRIDGE STRUCTURE	$/m2		$/m2		$/m2		$/m2	
Highway Overpass Structures	5,900 - 7,700		6,100 - 8,000		4,300 - 6,200		4,500 - 6,400	

Note: The unit rates reflect hard construction costs, including general requirements and fees, and exclude site works and tenant improvements. Variances in unit rates and escalation will occur due to the remoteness of some regions and prevailing local market conditions. Construction costs can also be affected by a multitude of factors that may not be limited to market conditions.

BTY has been publishing the annual Market Intelligence Report and a comparison of Cost Data Parameters since 2003. The Cost Data includes unit rates for selected project categories, based on in-house data surveyed on a provincial level, and tendered data where available. The comparison provides actual data for 2022 and forecast data for 2023, using escalation levels generated by BTY.

SASKATCHEWAN				ONTARIO				QUEBEC			
ACTUAL 2022		FORECAST 2023		ACTUAL 2022		FORECAST 2023		ACTUAL 2022		FORECAST 2023	
$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft	$/m^2	$/sq.ft
4,950 - 6,820	460 - 634	5,200 - 7,160	483 - 665	5,160 - 5,680	479 - 528	5,930 - 6,530	551 - 607	4,780 - 5,290	444 - 491	5,350 - 5,920	497 - 550
8,470 - 10,340	787 - 961	8,890 - 10,860	826 - 1,009	6,750 - 7,610	627 - 707	7,760 - 8,750	721 - 813	6,690 - 7,440	622 - 691	7,490 - 8,330	696 - 774
9,350 - 11,550	869 - 1,073	9,820 - 12,130	912 - 1,127	8,810 - 9,460	818 - 879	10,130 - 10,880	941 - 1,011	7,300 - 9,310	678 - 865	8,180 - 10,430	760 - 969
8,000 - 9,060	743 - 842	8,480 - 9,600	788 - 892	9,030 - 10,190	839 - 947	9,840 - 11,110	914 - 1,032	8,860 - 10,170	823 - 945	9,390 - 10,780	872 - 1,001
6,510 - 7,070	605 - 657	6,900 - 7,490	641 - 696	7,640 - 8,770	710 - 815	8,330 - 9,560	774 - 888	7,360 - 8,760	684 - 814	7,800 - 9,290	725 - 863
10,380 - 10,660	964 - 990	11,000 - 11,300	1,022 - 1,050	9,000 - 11,760	836 - 1,093	9,810 - 12,820	911 - 1,191	9,020 - 11,800	838 - 1,096	9,560 - 12,510	888 - 1,162
2,350 - 2,910	218 - 270	2,370 - 2,940	220 - 273	3,290 - 4,270	306 - 397	3,590 - 4,650	334 - 432	2,590 - 3,320	241 - 308	2,800 - 3,590	260 - 334
2,730 - 3,420	254 - 318	2,760 - 3,450	256 - 321	3,820 - 4,930	355 - 458	4,160 - 5,370	386 - 499	3,190 - 4,050	296 - 376	3,450 - 4,370	321 - 406
3,130 - 4,000	291 - 372	3,160 - 4,040	294 - 375	4,580 - 5,920	425 - 550	4,990 - 6,450	464 - 599	3,900 - 5,770	362 - 536	4,210 - 6,230	391 - 579
1,360 - 1,540	126 - 143	1,410 - 1,590	131 - 148	1,930 - 2,270	179 - 211	2,120 - 2,500	197 - 232	1,760 - 2,070	164 - 192	1,900 - 2,240	177 - 208
1,790 - 2,140	166 - 199	1,850 - 2,210	172 - 205	2,270 - 2,680	211 - 249	2,500 - 2,950	232 - 274	1,920 - 2,420	178 - 225	2,070 - 2,610	192 - 242
2,370 - 2,770	220 - 257	2,450 - 2,870	228 - 267	2,800 - 3,340	260 - 310	3,080 - 3,670	286 - 341	2,510 - 3,080	233 - 286	2,710 - 3,330	252 - 309
1,150 - 1,350	107 - 125	1,190 - 1,400	111 - 130	1,860 - 2,200	173 - 204	2,050 - 2,420	190 - 225	1,460 - 1,990	136 - 185	1,610 - 2,190	150 - 203
1,250 - 1,700	116 - 158	1,290 - 1,760	120 - 164	2,040 - 2,390	190 - 222	2,240 - 2,630	208 - 244	1,920 - 2,360	178 - 219	2,110 - 2,600	196 - 242
1,700 - 2,300	158 - 214	1,760 - 2,380	164 - 221	2,390 - 2,920	222 - 271	2,630 - 3,210	244 - 298	2,220 - 3,080	206 - 286	2,440 - 3,390	227 - 315
1,760 - 2,400	164 - 223	1,820 - 2,480	169 - 230	1,940 - 2,430	180 - 226	2,040 - 2,550	190 - 237	1,290 - 2,150	120 - 200	1,420 - 2,370	132 - 220
2,490 - 3,200	231 - 297	2,580 - 3,310	240 - 308	2,430 - 2,880	226 - 268	2,550 - 3,020	237 - 281	2,990 - 4,150	278 - 386	3,290 - 4,570	306 - 425
2,400 - 3,050	223 - 283	2,480 - 3,160	230 - 294	2,940 - 3,470	273 - 322	3,090 - 3,640	287 - 338	2,570 - 3,420	239 - 318	2,830 - 3,760	263 - 349
1,350 - 2,300	125 - 214	1,400 - 2,380	130 - 221	2,170 - 2,780	202 - 258	2,280 - 2,920	212 - 271	1,710 - 2,350	159 - 218	1,880 - 2,590	175 - 241
1,350 - 1,900	125 - 177	1,400 - 1,970	130 - 183	1,760 - 2,070	164 - 192	1,850 - 2,170	172 - 202	1,640 - 2,150	152 - 200	1,800 - 2,370	167 - 220
2,370 - 3,960	220 - 368	2,450 - 4,100	228 - 381	2,440 - 2,920	227 - 271	2,610 - 3,120	242 - 290	2,020 - 2,440	188 - 227	2,160 - 2,610	201 - 242
2,540 - 3,800	236 - 353	2,630 - 3,930	244 - 365	2,610 - 3,230	242 - 300	2,790 - 3,460	259 - 321	2,440 - 3,090	227 - 287	2,610 - 3,310	242 - 308
2,610 - 3,260	242 - 303	2,700 - 3,370	251 - 313	2,940 - 3,580	273 - 333	3,150 - 3,830	293 - 356	2,520 - 3,400	234 - 316	2,700 - 3,640	251 - 338
3,030 - 3,700	281 - 344	3,140 - 3,830	292 - 356	3,300 - 4,110	307 - 382	3,530 - 4,400	328 - 409	3,200 - 4,110	297 - 382	3,420 - 4,400	318 - 409
3,390 - 3,820	315 - 355	3,530 - 3,970	328 - 369	2,400 - 2,870	223 - 267	2,640 - 3,160	245 - 294	2,260 - 2,700	210 - 251	2,440 - 2,920	227 - 271
3,530 - 3,960	328 - 368	3,670 - 4,120	341 - 383	2,550 - 3,150	237 - 293	2,810 - 3,470	261 - 322	2,410 - 3,050	224 - 283	2,600 - 3,290	242 - 306
4,630 - 4,850	430 - 451	4,820 - 5,040	448 - 468	4,600 - 5,230	427 - 486	5,060 - 5,750	470 - 534	3,540 - 5,660	329 - 526	3,820 - 6,110	355 - 568
1,670 - 2,660	155 - 247	1,740 - 2,770	162 - 257	1,470 - 1,780	137 - 165	1,620 - 1,960	151 - 182	1,190 - 1,620	111 - 151	1,310 - 1,780	122 - 165
1,860 - 2,550	173 - 237	1,920 - 2,630	178 - 244	2,540 - 3,320	236 - 308	2,720 - 3,550	253 - 330	2,510 - 3,380	233 - 314	2,690 - 3,620	250 - 336
$/Lane km		$/Lane km		$/Lane km		$/Lane km		$/Lane km		$/Lane km	
1,274,300 - 1,440,400		1,312,500 - 1,483,600		1,245,100 - 1,519,100		1,307,400 - 1,595,100		1,614,900 - 1,812,700		1,695,600 - 1,903,300	
$/m2		$/m2		$/m2		$/m2		$/m2		$/m2	
5,000 - 7,200		5,200 - 7,500		5,800 - 8,800		6,100 - 9,300		6,300 - 9,000		6,700 - 9,500	

BTY strongly recommends that readers seek the advice of a Professional Quantity Surveyor (PQS) prior to establishing a budget for their specific projects.

3.0

International Markets in Focus

INTERNATIONAL MARKETS IN FOCUS

United States

High borrowing costs deflate residential construction boom as economy stalls

Robust Investment in Manufacturing and Infrastructure Lead Shift in Focus to Non-Residential Construction

Hamstrung by a rapid rise in interest rates and high inflation that progressed over 2022, economic growth in the U.S. is set to stall by the end of the year and continue with a slight contraction into 2023. The downturn follows the strongest annual average growth in nearly four decades in 2021.[36]

Single-family homebuilding will bear the brunt of the sharp drop in residential, with multifamily expected to deliver modest growth. The higher interest rates and ongoing elevated construction costs will continue to price out a large number of prospective buyers and depress housing starts well into 2023.[37]

Non-Residential Takes Up Slack

Traditionally, residential has comprised nearly 40% of total construction; in 2021 it had risen to almost 50%, and edged a few percentage points higher through most of 2022.[38] As residential building pulls back some non-residential sectors will also falter, but others will advance led by a wave of mega projects in semiconductors, liquified natural gas, refining, and green energy investments such as EVs, battery storage, and generation technologies.

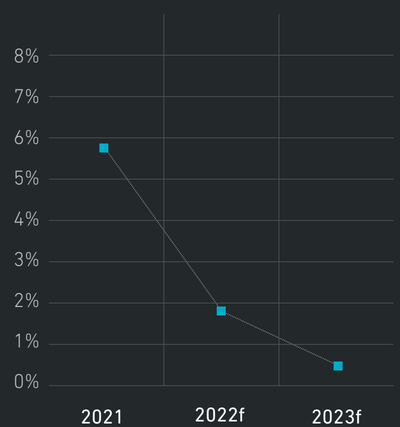
The largest is the Taiwan Semiconductor Manufacturing Corporation's (TMSC) $40 billion investment in two plants in Arizona.[39] It is one of the largest foreign investments in U.S. history. The second largest is Samsung's $17 billion semiconductor fabrication facility in Texas, which also has a $3.2 billion Texas Industries chip fabrication plant (Building 1). Phase 1 of Tellurian's Driftwood Liquefied Natural Gas (LNG) Production and Export Facility in Louisiana is valued at $10 billion. More than $40 billion is being invested in more than 15 gigafactories for manufacturing Electric Vehicle batteries, across the country.

> The increased investment in non-residential projects – both private and public – will face a combination of constraints that could slow project starts as well as delivery.

Many plants are creating clusters around existing or planned Tesla factories. One of the largest is Ford Motor Co.'s $5.8 billion Battery Park in Kentucky. A high percentage of the new and proposed plants are located in the U.S. rust belt, giving rise to what is now being called the new "battery belt."

36 "Long-Term Forecast", TD Economics, December 2022
37 "Homebuilders say housing starts will fall even further in 2023", Housing Wire, October 2022
38 "Construction industry snapshot", ConstructConnect, November 2022
39 "TSMC to up Arizona investment to $40 billion with second semiconductor chip plant", CNBC, December 2022

Real GDP Change



Federal Government Investment Supporting Green Energy and Infrastructure

Three pieces of federal legislation – the $550 billion Bipartisan Infrastructure and Jobs Act, the $369 billion Inflation Reduction Act, and the $52.7 billion CHIPS and Science Act all contribute funding that collectively supports the development of advanced technology and electric vehicle and battery manufacturing, clean energy, and climate-resilient infrastructure, including bridges and roads, transit, and water and wastewater. Investments in U.S. EV battery production alone have increased by 700% since the start of 2021.[40]

Non-residential building sectors expected to see low or negative growth from 2022 through to 2026 are office, public safety, commercial, lodging, amusement, and recreation.[41]

Manufacturing, boosted by attempts to re-shore production and sourcing of materials, healthcare, and private education should see steady growth.[42] Non-building higher growth sectors include highways, bridges and roads, water supply and wastewater treatment, and conservation and development.[43]

Constraints to Growth Remain

The increased investment in non-residential projects – both private and public – will face a combination of constraints that could slow project starts as well as delivery. Even with many Covid-19 issues no longer in play, higher interest rates and materials costs, continuing supply chain uncertainty, and shortages of both skilled labour and materials could lead to longer lead times.

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40 "Over $40 billion in EV investments establishes new US 'battery belt' with 15 new plants or expansions", Electrek, October 2022
41 "2021 North American Engineering and Construction Outlook Fourth Quarter", FMI, October 2021
42 "Non-Residential Construction Forecast: Slowing 2023-2024", Forbes, October 2022
43 "2021 North American Engineering and Construction Outlook Fourth Quarter", FMI, October 2021

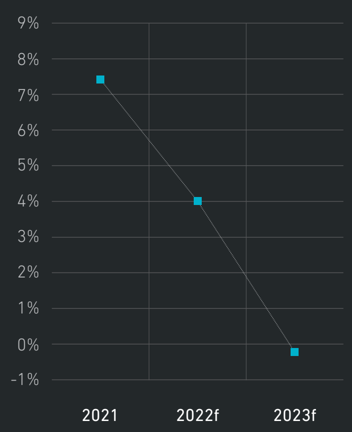
INTERNATIONAL MARKETS IN FOCUS

United Kingdom

Economic slowdown, higher interest rates and costs drive forecast for drop in construction

Feature summary from
Glenmhor Partnerships

Real GDP Change



Growth Projected to Drop 2% in 2022 and 3.9% in 2023[44]; Impact to be Greatest on Largest Sector, Private Housing[45]

The UK economy is currently facing a recession in 2023. Despite this prediction, the construction industry has outperformed the market and there is a shortage of labour and materials which has had an impact on pricing.

According to the U.K's Construction Industry Training Board, the country needs an increase of 45,000 workers per year is to meet expected output.

Construction companies are facing significant cost inflation due to supply chain disruptions, high energy costs, tight labour market, the impact of Brexit, and the war in Ukraine.

With GDP forecast to decline throughout 2023, it is unlikely that the construction sector will continue to out-perform the economy as it has done in 2022 with growth predicted to drop by 3.9% in 2023.

> Following growth of 3% in 2022, private housing output is now projected to decline by 9% in 2023 before returning to 1% growth in 2024.

The rise in interest rates to 3% in November 2022 – and the potential for further increases – along with uncertainty over general economic prospects are expected to curb demand for new builds in private housing which constitutes the largest sector in the U.K.'s construction industry.

Following growth of 3% in 2022, private housing output is now projected to decline by 9% in 2023 before returning to 1% growth in 2024. Private housing repair, maintenance, and improvement output, the country's third largest

44 "Construction output forecast to fall in 2023", Tomorrow's Facilities Management, September 2022
45 "Glenigan construction forecast shows weak construction output as UK economy haemorrhages", PBC Today, November 2022
46 "Construction output predicated to fall 'significantly' in 2023", Facilities Management Journal, November 2022
47 "Construction output forecast to fall in 2023", Tomorrow's Facilities Management, September 2022

construction sector, is forecast to decrease by 4.0 per cent in 2022 and 9.0 per cent in 2023, before marginal growth of 1.0 per cent in 2024.46 Social housing starts are also expected to slip in 2022 and 2023 following strong performance in 2021.

The second largest construction sector, infrastructure, is expected to be the least affected by rising interest. Infrastructure output is forecast to rise by 5.2% in 2022 before slipping to 1.6% in 2023. Larger projects already underway will provide a stabilizing influence, despite cost overruns and delays.47

These include the Hinckly Point C nuclear power station, now estimated to cost £25 billion and rescheduled to be operational in 2027, High Speed 2, with its Phase 1 alone valued at £17 billion, and the £4.2 billion Thames Tideway, scheduled for completion in 2025. Other major infrastructure programs that are proceeding after uncertainty over continued funding include core parts of the government's Northern Powerhouse Rail project estimated to range between £17 billion to £23 billion.[48] Funding of £12 billion has also been confirmed for the Department of Health and Social Care capital budget for 2022-23.

The largest project is the £466 million Jersey General Hospital, scheduled to start work early in 2023.[49]

The strongest area in the commercial sector has been industrial construction, with warehousing and logistics centres leading the way; they are forecast to post healthy growth in 2023 and beyond.[50]

The last quarter of 2022 saw a lull in new projects that dominate the commercial sector – new office and mixed-use developments. While there are a number of projects in the pipeline, the prospect of still higher costs and even recession may lead to delays or even cancellations.[51]

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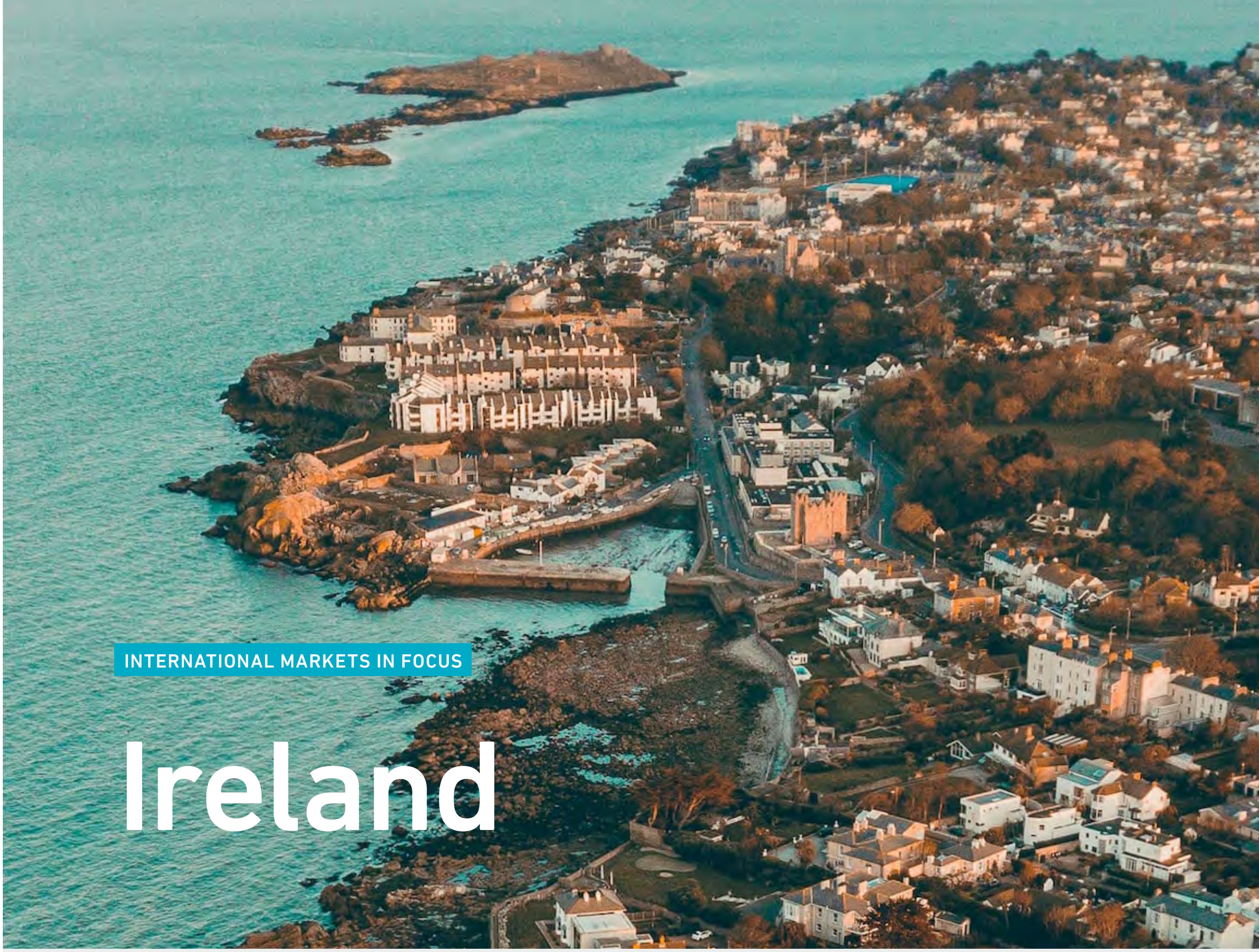
48 "Core Northern Powerhouse Rail projects set to go ahead", Glenigan, October 2022
49 "Funding boost for hospital construction, Glenigam October 2022
50 "Urban logistics: Planning for uncertainty", PBC Today, October 2021
51 "Construction output forecast to fall in 2023", Tomorrow's Facilities Management, September 2022



INTERNATIONAL MARKETS IN FOCUS

Ireland

Robust growth in construction moderates but levels remain healthy

Ireland is projected to fare better in the current high borrowing cost, inflation and uncertainty environment than its main trading partners – the U.K., the U.S. and the European Union. Even so, GDP is forecast to decline from 12.2% in 2022 to 4.9% in 2023.

A robust 22.5% increase in total investment year-on-year in the first half of 2022 over 2021 is expected to moderate, as is building and construction activity, which rose 18% year on year.[52] The construction industry is forecast to slip by 5% before posting a 2% gain in 2023.[53] Despite an evolving global slowdown Ireland's economy has continued to rebound from the pandemic with 13.6% growth in 2021, and forecast growth of 7.9% in 2022 and 3.2% in 2023.

Multiple factors support the optimistic outlook for both the medium and longer terms. Foreign direct investment (FDI) that has helped drive the country's growth remains strong, especially in sectors such as life sciences and information and communications technology (ICT).[54]

52 "Economic Forecast for Ireland", European Commission, November 2022
53 "Ireland Construction Industry Forecast", Construction Information Services, November 2022
54 "Ireland's Economic Outlook, Ireland & Global Economic Outlook H2 2022", KPMG, October 2022

The country now has 70 data centres with more than half a dozen under construction. They underpin Ireland's €132 billion (£113 billion) in Information and Communications Technologies CT exports and consume 11% of the energy generated on the grid. Another €7 billion in investment is expected by 2025, with much of it going toward improving energy efficiency and securing power from sustainable sources. Ireland is the 13th most attractive market internationally for renewable energy investment.[55]

Ireland also enjoys a skilled labour force, an open labour market, and access to both the U.K. and the European Union markets. Exports, especially those of multinational corporations making medical devices and pharmaceuticals or providing information and communication services, have become and remain engines of economic performance.

> Labour supply, however, remains a major concern as it teams up with increases in material costs to drive higher construction costs.

Labour supply, however, remains a major concern as it teams up with increases in material costs to drive higher construction costs. Contractors are looking to expand apprenticeship schemes, attract workers from overseas and induce older workers to work longer in their careers to meet the shortfall. They are also looking to modular and offsite construction to offset the squeeze on labour supply.

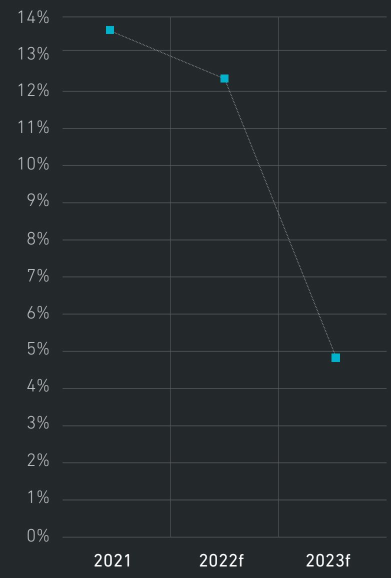
Homebuilding Remains a Construction Mainstay and Political Priority

The government's Housing for All strategy has set a target for the construction industry to deliver an average of 33,000 new homes every year between now and the end of the decade to meet demand, which appears to be a considerable underestimate based on recent reports and actual population growth.

That number would include 90,000 social homes, 36,000 affordable purchase homes and 18,000 affordable rental homes. While the post-2020 recovery saw increased demand that propelled the value of housing starts to a 49% increase in 2021, that figure is expected to decline by 19% in 2022 and into 2023, tempered by higher borrowing costs.[56]

The government has developed multiple approaches to achieving the new homes target, including social housing PPP bundles for which BTY has provided Infrastructure

Real GDP Change



Advisory and Assigned Certifier services. Other priority areas for investment in the government's National Development Plan and Project Ireland 2040 include transportation, healthcare, and education.

The plan allocates €35 billion (£30 Billion) for the transport system, including new light rail systems and 1,000 km of new and improved walking and cycling infrastructure. Spending on healthcare infrastructure under the plans includes the replacement and refurbishment of 88 Community Nursing Units across the country. BTY is serving as Pre/Post Bid Lenders' Technical Advisor in a €250 million (£214 million) project to develop Community Nursing Units.

The firm has also been engaged as Assigned Certifier and Independent Tester for the €200 million Higher Education Bundle 1, which involves the design, construction, financing, operation, and maintenance of six new buildings focused on STEM, ICT, Engineering, and Life Sciences at higher education institutions around Ireland.

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55 "Ireland 13th in EY Renewable Energy Attractiveness index", RTE, November 2022
56 "Ireland Construction Industry Forecast", Construction Information Services, November 2022

INTERNATIONAL MARKETS IN FOCUS

Turkey

Major building programs a mainstay as soaring inflation and depreciated currency slow growth

Hampered by persistent high inflation above 40% and a sharply depreciated lira over the last two years, Turkey is expected to see GDP drop from 5.3% in 2022 to 3% in 2023. The country's central bank also cut interest rates to 9% at the close of 2022, going against the global trend toward higher rates intended to help reduce inflation.[57]

The Turkish government has introduced multiple measures to shield vulnerable groups from inflation, especially from rising energy and food prices, in the short term. It has also launched major programs and projects in housing, energy, and transportation to help build economic stability. These projects will not only bolster the construction industry but also reduce the country's reliance on imported fossil fuels – whose rapid price increases over the past year have exacerbated the current inflationary spiral.

Construction is a key part of the Turkish economy. The sector experienced weak growth in 2021, struggling with the same challenges as other countries face such as rising materials costs in addition to Turkey's currency devaluation and the suspension of many development projects. The ambitious new programmes are intended to strengthen the construction sector and the wider economy. In September, Turkey announced the largest social housing project in the country's history. The new project includes the construction of 500,000 apartments, and the provision of 250,000 plots of land suitable for new homebuilding. The first phase, to be completed by 2025, calls for the construction of 250,000 apartments. The project will also provide 50,000 workplaces throughout Turkey's 81 provinces by 2028.[58]

Another expanding sector is renewable energy. Turkey's renewable energy capacity of nearly 53,500 MW comprises just over half of the nation's total installed capacity. Due to rapidly increasing energy demand that rose 9% in 2021, much of the capacity increase must come from renewable sources as Turkey has committed to net zero emissions by 2053.[59] Leading the way is Kaylon Enerji's 1.35 GW Karapinar solar power plant, Turkey's largest solar facility, nearly 11-km-long and 3-km-wide, equivalent to more than 4,600 soccer pitches.

Set to be fully operational by 2023, it is one the five largest power plants in the world. Another stream of energy will come from Turkey's first nuclear power plant, which will start generating electricity in 2023 from the first of four nuclear reactors. When all four are operational, the plant is expected to supply 10% of the country's electricity needs by 2026.[60]

New 30-Year Transport Plan

In Q1 2022, Turkey announced a 30-year strategy in which it plans to invest $198 billion in rail, road, maritime, and air transport and communications. The investments are expected to help add more than $1 trillion to the GDP, and $1.36 trillion to production, in addition to creating employment for 27.7 million people.[61] The plan will help shift the burden on land transport to the railways.

> Due to rapidly increasing energy demand that rose 9% in 2021, much of the capacity increase must come from renewable sources as Turkey has committed to net zero emissions by 2053.

A number of mega projects, many of them multi-year, started construction early in 2022. Among them are the $550 million IMM – Ucyol-Buca Koop Light Rail, the $500 million IBB – Kazlicesme – Sogutlucesme Metro Line in Istanbul, the $437 million Ankara Photovoltaic Industrial Park Phase II, and the $400 million Bursa Emek City Hospital Metro Line.[62]

As the country continues to build to meet the needs of a growing increasingly urban population, BTY is currently delivering Lenders' Technical Advisory services as well as Environmental, Social, and Health and Safety Advisory services on multiple projects in the healthcare, transportation and renewables sectors.

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57 "Türkiye projection note OECD Economic Outlook November 2022", OECD, November 2022
58 "The largest housing project in the history of Turkey", Gars Consulting, September 2022
59 "Turkey: Sponsored Briefing: Hot Topics In Turkish Renewable Energy Market", Mondaq, May 2022
60 "Turkey's Russian-built nuclear plant could amplify Moscow's regional influence", Al-Monitor, November 2022
61 "Turkey unveils 30-year plan to improve transport infrastructure", Railway Technology, April 2022
62 "Turkey: Five Largest Construction Projects Started in Q1 2022", Global Data, July 2022

INTERNATIONAL MARKETS IN FOCUS

Eastern Europe & Central Asia

War, inflation, and high energy costs set back building in Eastern Europe

The impact of Russia's continuing war on Ukraine has amplified the impact of high inflation, and high energy costs on construction in countries in the region. The forecast for the industry's output in Eastern Europe is a decline of 2.5% in 2022 followed by a further decrease of 2.7% in 2023. A higher risk of recession, tightening monetary policy, and high construction costs, along with low investor confidence are hindering growth across the region after it rebounded in 2021.[63]

Building activity in what had been two the region's stronger economies, Poland and the Czech Republic, is projected to grow by 4.9% and 2.9% in 2022, before seeing respective declines of 2.8% and 2.4% in 2023. Romania, the largest construction market in southeast Europe, had posted double-digit annual growth before the pandemic, then saw -0.3% growth in 2021; it is now expected to continue on a low to no growth trajectory in 2022 and 2023. Construction throughout the region is forecast to rebound in 2024 posting 3.3% growth.[64]

Foreign direct investment, especially from Germany, NextGenerationEU recovery funds are expected to help support economic stability and construction levels in Central, Eastern and Southeastern Europe (CESEE). The Next Generation EU (NGEU) facility will provide €750 billion to EU economies in grants and loans. An estimated €212 billion of that total will be allocated to Eastern and Central European countries.

> The forecast for the industry's output in Eastern Europe is a decline of 2.5% in 2022 followed by a further decrease of 2.7% in 2023.

The EU has focused on the green energy and digital sectors to combat climate change and promote digitalization as pillars supporting pandemic recovery and economic development and close the infrastructure gap between Eastern and Western Europe.[65] A Fall 2020 report from the International Monetary Fund estimated that every €1 spent on infrastructure yields short-term returns in the range of €0.5 to €0.8, and longer-term returns in the range of €1.7 and €2.5 in Eastern European countries.[66]

63 "Eastern Europe construction outlook increasingly gloomy for 2023 amid mounting headwinds, says GlobalData", Global Data, October 2022
64 Ibid
65 "EU Recovery Funding in CEE", Best Lawyers, December 2022
66 "Eastern Europe must chose infrastructure investment to fight the crisis", We Build Value Digital Magazine, November 2020
67 "Foreign investment has transformed Eastern Europe, says wiiw report", IntelliNews, December 2022

Increased Trade Promises to Advance Economic Development

German trade alone – now valued at €360 billion – with countries in the region now comprises one-fifth of Germany's total trade, which is greater than trade with the US and China combined.[67] As many Western European countries and companies seek to reorganize supply chains following the pandemic and its disruptions, the proximity and reliability of Eastern European suppliers augur well for the region's continued development, especially in infrastructure.[68]

New infrastructure is most needed in three areas. The first is connectivity across borders within the region and across the rest of Europe through better rail, road, and digital infrastructure. The second is energy transition towards low carbon and energy-efficient infrastructure. The share of renewable energy remains low in the region. The third area is digital transformation, including 5G, the Internet of Things, data centres, or access to flexible networks.[69]

Funding for such development is already in the works. In spring 2022, The European Union announced a coordinated investment plan for Ukraine as well as EU member states in the region.

The plan includes a cohesion fund for both war reconstruction and long-term infrastructure investment. A central element will be extending the existing TEN-T rail network plan into Ukraine. The expanded network will connect Poland, Ukraine, and the Baltic states, with connections to Berlin, Czechia, Bucharest, and Helsinki. The network is expected to be 6,000 km long, with a projected cost of €150 billion euros plus another €50 billion for connections.[70]

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68 Ibid
69 "Central and Eastern Europe: Transforming Infrastrucure", Actis, March 2022
70 "EU Reaches Deal for Eastern European Infrastructure Investment", Pedestrian Observations, April 2022

Eastern Europe & Central Asia

Foreign Direct Investment augurs well for development of renewables

Buoyed by record foreign direct investment in 2021 the economies of most Central Asian countries are weathering the volatility and uncertainty from Russia's war on Ukraine well. The region's GDP is forecast to grow by 4.3% in 2022 and 4.9% in 2023 – and upward revision from projections made in spring 2022.[71]

While regional FDI inflows are expected to decline in 2022 and 2023, as they have globally in general, there is strong growth momentum. Investment flows to Central Asia rose by 12% to $7 billion in 2021, with Turkmenistan leading with a 24% increase to $1.5 billion and Uzbekistan in second place with an 18% increase to $2 billion.

The region's largest economy is Kazakhstan, which recorded a drop of 14% to $3.2 billion with declines in extractive and transportation industries. Those three countries are rich in both oil and gas resources, while Tajikistan and Kyrgyzstan – the other two Central Asian countries have significant water – and hydropower – resources.[72] All have significant renewable energy potential.

Infrastructure Investment for Renewables Increases

China has been a major source of investment in the region through its Belt and Road Initiative (BRI). Total Chinese investment in Central Asia was an estimated $40 billion at the end of 2020; more than half had been directed to Kazakhstan.[73] Chinese spending focused on oil and gas pipelines, coal plant development, and rail and road building. Yet in 2020, even as China's overall BRI spending downshifted, investment in renewables eclipsed that made in fossil fuels, increasing from a 38% to a 57% share in one year.[74]

Kazakhstan now plans to secure 10% of its energy supply from renewables by 2030 and 50% by 2050. Abundant sunshine and strong winds make the country well suited for green energy development, with wind power potential estimated at 920 billion kWh/year, and solar power at 2.6 billion kWh/year.

Uzbekistan, with the second largest regional economy, aims to increase the share of its renewables, including hydropower, to 25 percent by 2030.[75] Some of that hydropower increase will come from Central Asia's first nuclear power plant, an $11 billion-dollar project slated to start construction in Uzbekistan in 2022 with commissioning projected for 2028.

Expanding Connections through Transportation Infrastructure Remains Key

China's railways already connect, through Kazakhstan, to those of Central Asia and then through Russia to Europe. That route has enabled China's rail trade with Europe to expand from $8 billion to $75 billion from 2016 to 2021. But moving goods through Russia has now become problematic due to sanctions for its war on Ukraine.

A new $4.1 billion railway line, expected to start construction in 2022, will connect China, Kyrgyzstan and Uzbekistan. The new line would open a route from China to Europe through Turkmenistan, Iran, and Turkey, shortening the journey by some 900km and eight days.[76]

Supporting Public-Private Infrastructure Development

The largest infrastructure project in Kazakhstan outside the oil and gas sector, the Almaty Ring Road, has served as a door opener for infrastructure development opportunities in the region. BTY is providing Environmental and Safety Advisory services on the project. Kazakhstan also launched the first healthcare PPP project in Central Asia, the Almaty Hospital Concession, a multidisciplinary 300-bed hospital. BTY provided Technical, Environmental and Social Deal Advisory services on the concession development. On another healthcare project, the 570-bed Turkestan Hospital, BTY is providing Lenders' Technical Advisory Services.

> Investment flows to Central Asia rose by 12% to $7 billion in 2021, with Turkmenistan leading with a 24% increase to $1.5 billion and Uzbekistan in second place with an 18% increase to $2 billion.

Georgia is another Central Asia adjacent country to embrace private investment to improve infrastructure. One of its collaborative projects involves upgrading the electricity grid to further support the renewable energy generation sector. For the new Nygoza Wind Power (50MW) project in Georgia, BTY is providing the Environmental and Social Impact Assessment.

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71 "A cold winter ahead? Confronting the new energy crunch, Regional Economic Prospects", EBRD, September 2022
72 Foreign investment in developing Asia hit a record $619 billion in 2021", UNCTAD, June 2022
73 Ibid
74 "Central Asia courts green energy investors", Eurasianet, April 2021
75 Ibid
76 "Two new railway lines could transform Central Asia", The Economist, September 2022

4.0

Major Trends Shaping Construction

MAJOR TRENDS

Making Supply Chains More Elastic

A more flexible and adaptable solution when disruption has become the norm and demand rises for smarter, faster, greener logistics.

Disruptions to supply chains in the construction industry over the past two years, from pandemic-driven shutdowns, war, and extreme weather events have been unprecedented – and often unpredictable. They have made forecasting supply and demand more unreliable – and planning supply chains more challenging.

Traditional supply chains have fixed – or inelastic – capacity based on forecasts and struggle to adjust to shifts in market conditions. Either there is too much or too little capacity. Building elasticity into the supply chain enables more flexibility and adaptability when unpredictable disruptions occur.

Having greater elasticity lets businesses grow or reduce capacity at low incremental costs to meet ever-shifting demands. The challenge becomes less about predicting where demand will go and more about making sure the supply chain capacity can fluidly expand or contract in response to volatile demand.[77]

Smarter Technology Enables Greater Elasticity

Supply chains of the future will be increasingly smart and technology-driven – and especially critical in construction. Cloud computing already enables computer processing and storage to quickly expand and contract to meet changing demand. That on-demand computing power in turn allows analysis of a steady flow of data – increasingly from Internet of Things (IoT) and on-site drones – and opens up ever-higher visibility into supply chains real-time status and performance.[78]

Applications such as advanced track and trace, blockchain, and predictive analytics based on machine-learning and artificial intelligence will further improve visibility across an entire supply network—and make supply chains faster and less prone to disruption.[79]

End-to-end visibility is especially critical for construction, in which many key products are unique, often custom-designed and built using multiple suppliers. When one of them can't produce materials at the right time, there is a knock-on effect on the rest of the project, often resulting in lost time as well as added costs.

Implementing true end-to-end visibility within the supply chain enables companies to identify risks and possible alternatives. Being able to generate and access real-time data and using analytics to produce insights from it are key to building and benefiting from visibility.[80]

Intelligent Asset Management After Construction

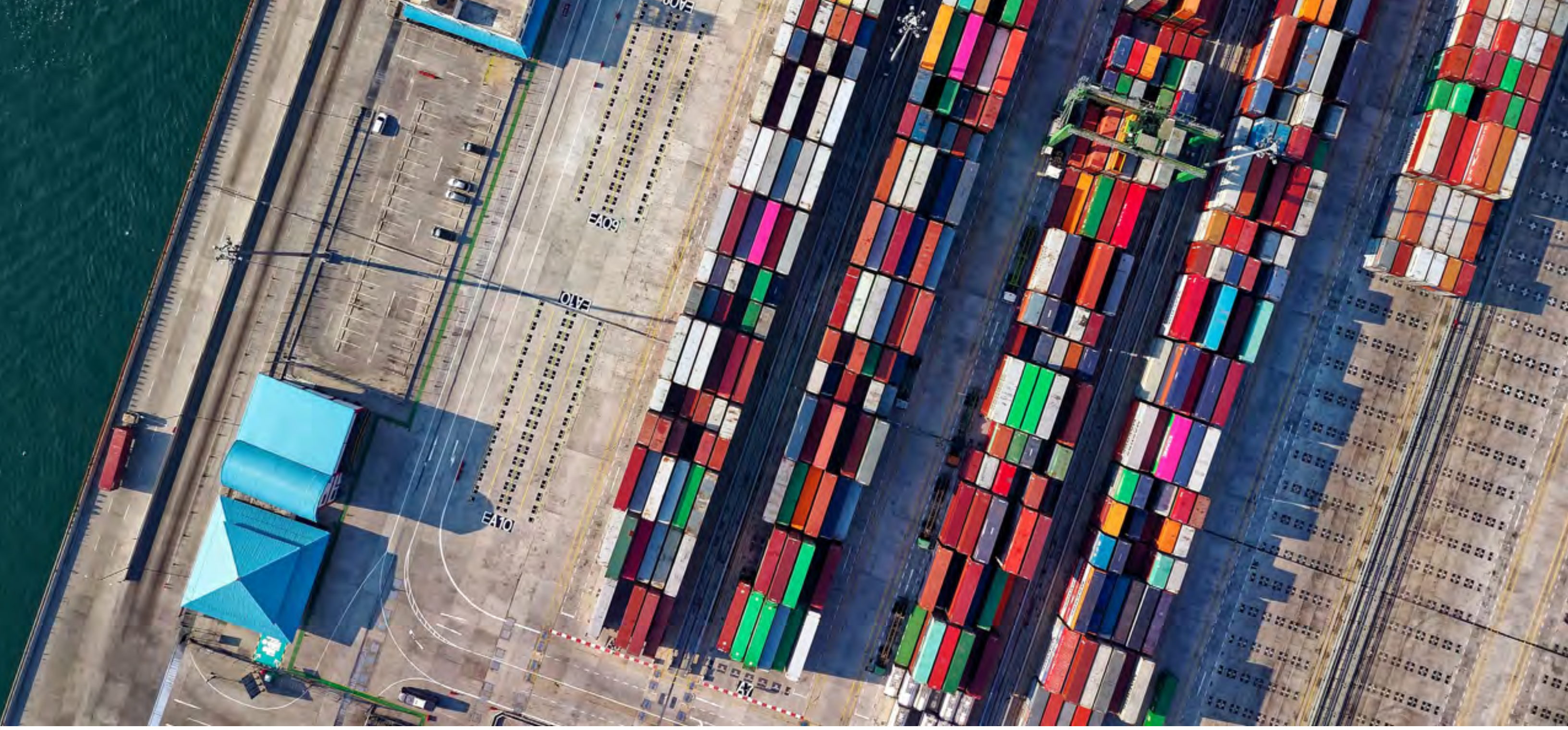
Internet of Things and Digital Twinning enable real-time managing and tracking maintenance and facilities to improve building efficiency and automate tasks using device and sensor tracking. This allows better resource management enabling managers to predict, detect, and solve issues before they happen. Pairing the physical and digital worlds enables data analysis of system monitoring to fix problems before they occur, prevent downtime, and even plan for the future using simulations.[81]

In the longer term, advanced analytics will be able to automate risk-assessment processes, enabling dynamic assessment based on real-time visibility into inventory levels and recent supply-chain performance. In construction, this can mean analyzing past project data to predict future project issues and performance.

Greener, More Sustainable and More Transparent

Public demand and government regulations for more sustainable, more energy-efficient buildings are pushing supply chains to be greener as well. With 60% of customers willing to pay more for sustainable products,[82] more companies will be embracing eco-friendly supply chain practices. Electricity and transportation are major contributors to greenhouse gas emissions in both construction and supply chain operations so the push toward greener logistics is quickly gaining traction. Warehouses are becoming more energy efficient, monitoring the usage of

77 "Building Elastic Capacity Into Your Supply Chain", Forbes, August 2022)
78 "14 Supply Chain Trends for 2022/2023: New Predictions To Watch Out For", Finance Online Review for Business, January 2023
79 "Supply Chain Resilience", The Conference Board, June 2021
80 "Managing risk – Knowing your supply chain", RSM, November 2020
81 4 ways the construction industry can use technology to fix the supply chain and empower employees", Microsoft Industry Blogs – United Kingdom, February 2020



power, heat, water, and gas to reduce waste, and there is increasing use of electric and solar-powered vehicles.

> Warehouses are becoming more energy efficient, monitoring the usage of power, heat, water, and gas to reduce waste, and there is increasing use of electric and solar-powered vehicles.

Increased transparency will also feature in future supply chains. While some companies have provided data on the sustainability of their supply chains, more will be required than just reporting their carbon footprint. Other areas for reporting supply chain impact include jobs created, sourcing practices, and types of labour and modes of transportation used.

Circular Supply Chains in Construction's Future?

In many industries, circular supply chains are expected to replace linear ones.[83] In a circular supply chain, manufacturers refurbish discarded products for resale. Many companies, spurred by a combination of rising materials cost, the uncertainty of availability, increasing regulation on recycling and waste disposal, and consumer preferences for more sustainably produced goods, are choosing to recover, break down products, and return them to their original form.

There are multiple benefits: reduced costs of raw materials, reduced risk of unavailability and cost volatility, and overall reduced environmental impact. To many in the construction industry, however, the possibility of a circular supply chain remains unrealistic.

Globally, the construction industry needs to build an average of 13,000 buildings every day through 2050. Yet it is currently estimated to be using two-fifths of the world's energy and materials flow, while contributing 13 to 30 per cent to total waste. Circularity is now a must to meet demand and reduce impact.[84]

The Buildings as Material Banks (BAMB), a European Union-funded Horizon 2020 programme is pursuing the systemic shift in sustainable building that is needed. The programme is envisioning construction that considers the entire life-cycle of a building beyond its operational phase, plus every component in it, complete with extended and embodied carbon footprint.[85]

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82 "Sustainability sells: Linking sustainability claims to sales", NielsenIQ, October 2018
83 "Building a Circular Supply Chain for a Circular Economy", EastWest News, April 2020
84 "Can the circular economy in construction really work?", Raconteur, August 2019
85 Ibid

MAJOR TRENDS

Infrastructure Gap in First Nations Communities

Canada needs to invest $349.2 billion to "Close the Infrastructure Gap" for First Nations across the country, according to the latest national estimate by the Assembly of First Nations.

BTY was engaged by the Assembly of First Nations (AFN) to quantify the capital and operating costs for asset improvements to bring their performance and access requirement on par with community infrastructure readily available to non-Indigenous Canadians.

Working closely within a team of industry leaders, including Associated Engineering, First Nations Engineering Services Ltd., and Planetworks, BTY's report is the first comprehensive accounting of costs necessary to remedy current shortfalls, and future needs based on projected population growth. The Indigenous population – now at 1.8 million – grew by 9.4% from 2016 to 2021, far surpassing the growth of the non-Indigenous population over the same period (+5.3%).[86]

The gap between the levels of infrastructure amenities – and access to them – that First Nations have compared to those of non-First Nations individuals has remained stubbornly wide. The scale and variety of First Nations infrastructure deficits are enormous and geographically diverse. They span a wide range of asset classes for more than 600 First Nations across Canada, from utilities and housing to education, transportation, healthcare, broadband connectivity, and community facilities.

Over the past decade, many First Nations have expanded their economic development beyond casinos and gaming to real estate and commercial enterprises to support long-term economic development. Now they are increasingly taking the lead in infrastructure development that builds self-government and community prosperity – and expanding their capacity to play a larger role in closing the infrastructure gap.

Projects to date and in the pipeline span power generation and transmission, water and wastewater treatment, broadband and rail service expansions and upgrades, and development of urban reserve lands. Typically, they involve new partnerships and pathways to affordable capital.

Bringing Power to Remote Communities in Ontario and Alberta

The largest of the First Nations-led infrastructure projects in Canada is a $1.83 billion, 1,800-km. transmission project that will connect 17 remote First Nations to the Ontario power grid. The project is being developed by Wataynikaneyap Power LP, a licensed transmission company equally owned by 24 First Nations (51%), in partnership with Fortis Ontario Inc. and other private investors (49%).[87]

86 "Indigenous population continues to grow and is much younger than the non-Indigenous population, although the pace of growth has slowed", Statistics Canada, September 2022
87 "The Wataynikaneyap Transmission Project", Fortis Ontario
88 Ibid

With the first community connected in Phase 1, it is expected that building and operating Phase 2, which connects the remaining 16 remote communities, will save $1 billion in operating costs compared to continued reliance on diesel generation, which currently costs an estimated $43 million a year.[89]

In Alberta, an innovative partnership is enabling the development of the Cascade Power Project, a $1.5 billion, 900-megawatt combined cycle power generation facility near Edson. Six Alberta First Nations formed the Indigenous Communities Syndicate LP (ICS) to invest in the project, with a loan guarantee provided by the Alberta Indigenous Opportunities Corporation (AIOC). AIOC can provide up to $1 billion in loan guarantees to help reduce the cost of capital for Indigenous groups and make it easier to raise capital to invest in natural resource projects.[89]

Water and Wastewater Treatment Projects on the Coast and Prairies

The new replacement of Port Stalashen Wastewater Treatment Plant on shíshálh Nation lands near Sechelt, British Columbia will be fully owned and operated by shíshálh Nation Government District (sNGD). Modernizing aging water treatment infrastructure enables economic growth, protects the coastal environment, and safeguards public health. Canada Infrastructure Bank, through the Indigenous Community Infrastructure Initiative (ICII), is providing shíshálh Nation access to affordable capital to accelerate and future-proof their community's infrastructure needs.[90]

The English River First Nation is upgrading the Grasswood Wastewater Treatment Plant in Grasswood Urban Reserve, just south of Saskatoon. The project includes the construction of a facility with a membrane bioreactor along with surrounding improvements including the construction of enabling infrastructure such as sewer lines, roadworks, and utility connections. The project will tie into the existing Grasswood commercial area to the South, and will provide a roadway for future development. BTY is providing Lenders' Technical Advisory Services on the project.

Building Infrastructure for Urban Reserves

BTY is also providing Lenders' Technical Advisory Services Kahkewistahâw Landing, a Kahkewistahâw First Nation project for creating an urban reserve within Saskatoon. The project features site servicing and infrastructure installation for 40 acres of commercial / industrial zoned land in preparation for a commercial development that will follow. The development will have office buildings, industrial facilities, a motel, a medical centre and commercial retail units. Kahkewistahâw Landing builds on the First Nation's experience in constructing an urban reserve in Yorkton, SK.

Building Capacity for Developing Indigenous Infrastructure

A new program being developed by AFOA Canada in collaboration with the Canada Infrastructure Bank (CIB) and TD Bank Group (TD) will create a project financing certification program that will strengthen Indigenous peoples and communities' abilities to structure and manage large infrastructure projects.[91] AFOA Canada is a not-for-profit association that helps Indigenous people better manage and govern their communities and organizations with a focus on enhancing management, finance, and governance practices and knowledge.

Closing the Infrastructure Gap
total estimated cost: **$349.2 billion**

- **$208.9 billion** for community infrastructure and federal investment strategies
- **$135.1 billion** for housing, overcrowding, and homelessness crisis
- **$5.2 billion** for bringing high-speed Internet to over 466 First Nations

Indigenous communities continue to face challenges when attempting to develop infrastructure for their communities. Often there are limited human and financial resources and capacity, and always great demand to deliver on programs and services. The certification program will help Indigenous communities better understand project financing for large infrastructure projects and support participants in building confidence to collaborate with other project partners and consultants. The goal is to build capacity in Indigenous communities to support future economic growth.

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89 "First Nations playing greater role in Canadian infrastructure development", Journal of Commerce, March 2021
90 "Port Stalashen Wastewater Treatment Plant", Canada Infrastructure Bank.
91 "AFOA Canada launches new certification program aimed at closing the infrastructure gap facing Indigenous communities", AFOA, November 2022

MAJOR TRENDS

Decarbonizing the Built Environment with District Energy

More than 100 countries and a growing number of companies have set target dates for achieving net-zero carbon. This means all greenhouse gas emissions (GHGs) produced are counterbalanced by an equal amount of emissions that are eliminated.[92] Decarbonizing is the path and process to net-zero.

Getting there means reducing GHGs that come from burning fossil fuels by using energy from zero-carbon renewables such as wind, solar, hydropower, geothermal, and biomass. It also means electrifying as many sectors as possible. While improving energy efficiency will reduce demand for energy, expanding electrification will increase it. So, decarbonizing will also require capturing emissions and improving carbon storage.

Every Sector Needs to Change

Every part of the economy will have to find ways to decarbonize; solutions will vary by sector. The GHGs that are warming the planet come primarily from generating power, industrial processes, manufacturing goods, transporting them and people on land, sea and air, growing our food, and heating, cooling and powering the buildings, factories, and homes that form a major part of the Built Environment.

The Built Environment is one of the Largest GHG Emitters

The built environment generates 40% of annual global C02 emissions, more than any other single component of annual global C02 emissions. Building operations are responsible for 27% of the annual total, with the building construction industry and other construction industry activities, such as infrastructure development, responsible for an additional 13% annually.[93] Two-thirds of the global building stock – and 80% of offices – in 2040 will be buildings that exist today. Without upgrades, they will still be emitting GHGs.

Energy Upgrades are Essential for Reducing Building Emissions

Every existing building will need to undergo energy upgrades, whether improving energy efficiency in operations, shifting to electric or district heating systems powered by carbon-free renewable energy sources, or generating or sourcing carbon-free renewable energy. In most cities, there are relatively few big buildings responsible for about 50% of city-wide building sector emissions, and a large number of small buildings responsible for the remaining 50% of emissions.[94]

92 "What Is Decarbonization, and How Do We Make It Happen?", Columbia Climate School, April 2022
93 "Why the built environment?", Architecture 2030
94 ibid
95 "Capturing Carbon's Potential: These Companies Are Turning CO2 into Profits", Columbia Climate School, May 2019

District Energy Systems Can Reduce Primary Energy Consumption by 50%

These big buildings are typically located in downtown cores of clusters. And that makes creating, expanding, or upgrading district energy solutions an unusually effective intervention for reducing GHGs in central urban areas, neighbourhoods, military bases, hospital complexes, and college campuses where there are multiple buildings concentrated in a single area.

A district energy system is a network of pipes that heats and cools buildings across a neighborhood or an entire city. Modern district energy systems connect renewables, waste heat, thermal storage, power grids, thermal grids, and heat pumps together – and can deliver up to 50% less primary energy consumption for heating and cooling.

> The built environment generates 40% of annual global C02 emissions, more than any other single component of annual global C02 emissions.

Over the past 20 years, BTY has provided multiple services – including Project Management, Technical Advisory, and Cost Management – on some of North America's most innovative district energy projects. One of the largest district energy projects is the Deep Lake Water Cooling (DLWC) Expansion in Toronto.

BTY is providing Project Management services to Enwave Energy Corporation's DLWC system that draws cold water from Lake Ontario to cool more than 90 commercial and residential buildings, educational campuses, government buildings, and hospitals in Toronto's downtown core. The latest expansion phase will provide 40% more cooling capacity, avoid more than 70% of peak electricity demand and reduce GHG emissions by more than 80% when compared to traditional cooling systems.

BTY also served as the Lenders' Technical Advisor and offered Project Management services for EAS Energy Partners on what has become North America's largest sewer heat recovery system at the National Western Center for heating and cooling buildings with recycled thermal energy from nearby sewer lines on its 250-acre campus in Denver, CO. The firm is also providing Lenders' Technical Advisory Services for the re-development, expansion and modernization of district energy systems at the California State University at Fresno and the University of Idaho.

Carbon Capture and Storage

The Intergovernmental Panel on Climate Change (IPCC) has warned that global warming must be limited to 1.5˚C to avert the worst effects of climate change – and that it cannot be achieved without removing C02 from the atmosphere.[95] Carbon capture, utilization, and storage needs to be expanded to capture CO2 emissions from remaining fossil fuel power plants. This CO2 can be used onsite or transported elsewhere for use in fuels, chemicals, or building materials, or injected into an underground reservoir for permanent storage.[96] BTY provided advisory services on the pioneering phase of the Alberta Carbon Trunk Line (ACTL), the world's largest carbon capture and storage project in Canada's leading oil-producing province of Alberta, which has committed $1.24 billion through 2025 for two commercial-scale carbon capture and storage projects to support efforts to reach zero net emissions.[97]

C02-based products could be worth between $800 billion and $1 trillion by 2030. The use of CO2 for producing fuel, creating alternate building materials and/or enriched concrete, and generating power could reduce greenhouse gas emissions by a billion metric tons yearly. The Global Carbon Initiative projects that by 2030 the CO2-based product industry could utilize seven billion metric tons of CO2 each year, almost about 15% of current global emissions.

Making Concrete with CO2 Concrete

In the near term, using CO2 to make concrete is the best prospect for the widespread use of CO2 captured from the atmosphere. Concrete is a principal building material for constructing buildings and infrastructure around the world. Concrete production contributes to 8% of global annual carbon emissions. With the size of Paris being built globally every single week for the next 40 years, the demand for concrete is significant. The concrete industry becoming net zero is vital to halving carbon emissions by 2030 and limiting global temperature rise to 1.5 ˚C.[98]

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96 "What Is Decarbonization, and How Do We Make It Happen?", Columbia Climate School, April 2022
97 "Capturing Carbon's Potential: These Companies Are Turning CO2 into Profits", Columbia Climate School, May 2019
98 "Net zero concrete programme launched by Climate Group and global built environment industry", Climate Group, July 2022

Immigration Targets Recast Labour and Demand Outlook

Record immigration bolsters workforce as waves of aging boomers retire and average birth rate hits record low

Having enough workers to build Canada's future critical to construction industry

In Spring 2022, the average birth rate for women in Canada had declined to a record-low 1.4 children per woman of child-bearing age. That figure was down from the previous low of 1.47 in 2019. The natural replacement rate for a population is 2.1 children per woman of child-bearing age. Canada's birth rate has been in steep decline for decades.

But Canada's population grew by 5.2%, between 2016 and 2021, adding 1.8 million people – with nearly 80% of new residents coming from other countries.[99] In Fall 2022, the Government of Canada set a target to welcome a record number of immigrants between 2022 and 2025 – nearly 1.85 million people over four years, or an average of 462,000 new residents annually.[100]

That is slightly more than the combined populations of provinces of Saskatchewan and New Brunswick, nearly eight times the number of permanent residents each year proportionately accepted by the UK, and four-times more than accepted proportionately by the United States. Immigration already accounts for nearly all of the growth in Canada's labour force. It is also projected to account for all of the country's population growth by 2032.[101]

The question is whether the influx of newcomers will be large enough to offset the waves of boomers set to retire. More than 300,000 Canadians retired in the first three quarters of 2022, up from 233,000 in 2021. With more than one in five Canadians of working age between 55 and 64 years old, the number of people nearing retirement age is higher than ever. Today, the average retirement age is 64, which means many more Canadians are about to quit work, permanently.[102]

Construction industry faces daunting shortfall

Even with the slowdown in construction expected in 2023, the industry will be challenged to recruit more than 309,000 new workers to replace retirees and keep pace with demand in the coming years. Projections estimate a shortfall of up to 81,000 workers by 2030.[103]

Making up that gap with newcomers may prove to be challenging as immigrants are under-represented in the building trades. Although immigrants make up 23% of the Canadian labour market, they comprise only about 18% of the construction industry workforce.

Part of the reason for that is that immigration policy has focused on attracting immigrants with higher levels of education. Such new arrivals in Canada are less likely to be drawn to careers in the construction industry.

Programs and policy changes to attract immigrants to construction

There are multiple programs to help bring in more immigrants to the industry. The Atlantic Immigration Pilot program enables employers in Atlantic Canada to hire qualified candidates for jobs they can't fill locally. The Provincial Nominee Program allows provinces to select immigrants with specific skills, education, or work experience, which may help reshape the mix of immigrants moving to these regions.

In BC, which is expected to experience the most severe construction labour shortage crunch, the BC Construction Association has developed a program that focuses on integrating newcomers into the industry through its Skilled Trades Employment Program.

99 "Canada's population surges from 2016-2021 on immigration-official data", Reuters, February 2022
100 "Immigration, Refugees and Citizenship Canada Departmental Plan 2022-2023", Government of Canada
101 "Canada: Why the country wants to bring in 1.5m immigrants by 2025", BBC News, November 2022
102 "Employers look for new ways to recruit as aging workers contribute to ongoing labour shortage", CBC News, October 2022
103 "Canadian Construction Industry Needs Hundreds of Thousands of Workers As Economy Rebounds", Immigration.ca, September 2021

On a national scale, changes to federal immigration policies are required to support regional efforts to attract the qualified skilled trade professionals they need.[104] Some of the changes are already in the works.

They include raising the percentage of immigrants in the economic class to over 60% by 2025, and using new features in the Express Entry System to welcome newcomers with the required skills and qualifications in sectors facing acute labour shortages.

Although immigrants make up 23% of the Canadian labour market, they comprise only about 18% of the construction industry workforce.

These include healthcare, manufacturing, and STEM professionals as well as the building trades. There will also be increases in support for regional programs, the Provincial Nominee Program, the Atlantic Immigration Program, and the Rural and Northern Immigration Pilot.[105]

Supporting new homebuilding to attract immigrants

Higher inflation and affordability issues could dampen Canada's appeal to new immigrants – especially those needed to build the new homes, schools, hospitals, and infrastructure needed for a growing, as well as aging population. The federal government's spring 2022 budget focused on the shortage of affordable housing with strategies designed to double the level of construction in housing over the coming decade.

The Canada Mortgage and Housing Corporation (CMHC) estimates that 5.8 million new homes must be built to restore housing affordability by 2030. Current rates of construction would increase the housing stock by 2.3 million units. An additional 3.5 million affordable housing units are needed by 2030.

The federal government's focus on addressing the shortage of affordable housing involves strategies designed to double the level of construction in housing over the coming decade with a wide range of measures. These include multi-billion-dollar funding for affordable new home construction, expansion of co-op housing, and tax-free savings accounts and incentives for first-time buyers.[106] To further support the affordability of homeownership for Canadian citizens and permanent residents, the federal government imposed a two-year ban, effective on January 1, 2023, on foreigners buying residential property in urban areas in Canada.[107]

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104 "Immigration trends in the Canadian construction sector", BuildForce, October 2020
105 "An Immigration Plan to Grow the Economy", Government of Canada, November 2022
106 "Canada Needs To Build More Homes To Welcome Immigrants: Minister", Immigration.ca, April 2022
107 Ibid


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