Calgary

Fall 2022

Calgary and Region Economic Outlook

2022-2027

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Introduction

The City of Calgary (The City) tracks economic indicators throughout the year to develop insights about the impacts of external events on the local economy. The results are published in the Economic Outlook publicly semi-annually in the spring and fall.

The City's Spring Economic Outlook is released in late April every year. It typically follows and incorporates insights from a spring release of the Government of Alberta budget. The late-October release of the Fall 2022 Economic Outlook supports work leading to Council deliberations, decisions and approvals in November 2022 for the ultimate approval of the 2023-2026 Service Plans and Budgets.

Purpose

The Fall 2022 Economic Outlook has been created to support The City's financial and physical planning. It provides a reasonable basis for decision-making by outlining and clarifying the economic opportunities and threats the region faces. The outlook considers several economic indicators. The choice of indicators reflects factors considered likely significantly affect the local economy over the forecast period.

Plan

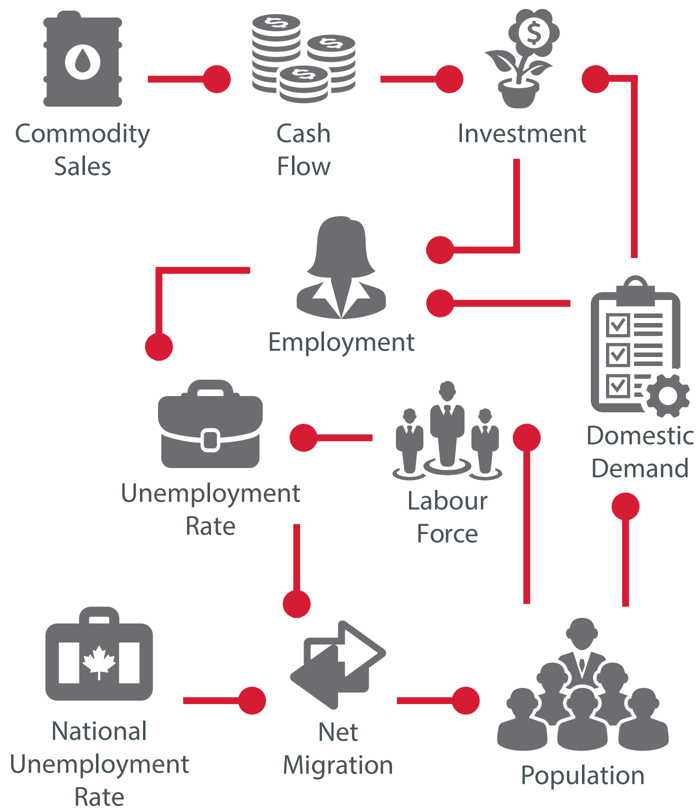
There are two areas or economies of interest. The first is the local (or city of Calgary) economy. The second is the regional economy (Calgary Economic Region or CER).

The CER is a small open economy affected by changes outside its borders. Consequently, external influences from the provincial, national and world economies get transmitted to the local and regional economies. Outside factors judged to have a substantial impact get presented as forecast assumptions. Most of the forecast estimates in the assumptions section reflect the average expectations of private sector forecasters. That's unlike all the CER forecast estimates that are the output of City of Calgary forecast models validated by private sector forecasts.

The economic cycle for commodity-based regions helps to inform projections of economic activity in the CER. The level of crude oil sales affects the cash flow of Alberta's energy industry and investment in the local economy. A summary of the path from crude oil sales to increased domestic demand is available in the chart below. The Fall 2022 Economic Outlook uses assumptions about changes in the path for the 2023 to 2027 period as follows:

- A deceleration in U.S., China, and world economic expansion;
- Sustained relevance and importance of the local oil and gas industry despite de-carbonization efforts; and
- Local and provincial economic growth and job creation should slightly outstrip the rest of Canada.

Transmission from Strong Commodity Performance to Strong Economic Performance



Payoff

The Fall 2022 Economic Outlook provides a comprehensive set of estimates on the future conditions for Calgary's local and regional economies. Like the work of alternative forecast providers, it uses theoretical and empirical economic underpinnings. Unlike the work of alternative forecasters, it provides the complete set of indicators requested by local decision-makers for the city and CER.

Finally, it tackles key recurring questions posed by City of Calgary decision-makers:

- What is the overall forecast for the growth rate in the local economy?
- What are the drivers of the local economy?
- How many jobs is the local economy expected to create?
- What is the forecast for population growth in the city and region?
- What is the expected inflation rate?
- What are the implications, especially for municipal finance?

Executive Summary

1. Robust energy sector role within the context of the movement to cleaner energy to help drive local and regional growth

The primary takeaway is better economic performance in Calgary and other Alberta communities in 2022 and 2023 as the Bank of Canada works to achieve a soft landing for the Canadian economy. That's because the energy sector's importance to Alberta, particularly Calgary, remains.

In 2021, mineral fuel, including crude oil, was Canada's top exported good, with nearly one out of every four dollars of exports. Eighty-two per cent of Canadian crude oil production was from Alberta. Most Alberta producers have their headquarters in Calgary. So, crude oil production is a significant driver of local and regional economic growth. From 2021 through 2027, crude oil exports should continue to grow. However, the pace of export growth is expected to decelerate. That's because the production growth across Canada would fall below the pace of consumption growth within Canada. The additional units produced would make their way to export markets.

From 2022 to 2027, production and export growth would occur for the two forecast scenarios currently driving forecast expectations led by the work of the Canada Energy Regulator. The first ('current policies') scenario assumes limited action to reduce greenhouse gas emissions (GHGs) beyond present-day policies. The second ('evolving policies') scenario assumes less global demand for fossil fuels and increased use of low-carbon technologies. The difference between the scenarios is a faster compound annual production growth rate from 2021 to 2027 for the 'current policies' scenario (3.1 per cent) than the 'evolving policies' scenario (2.4 per cent).

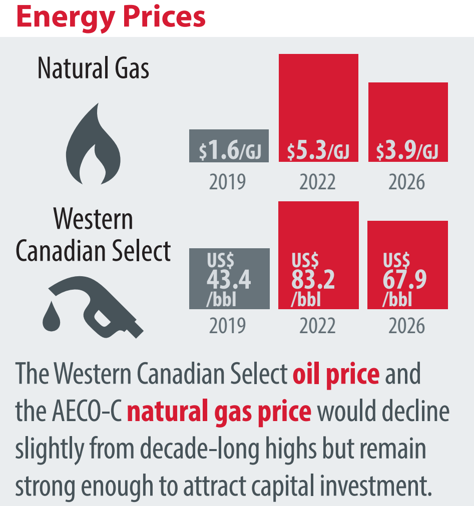
Given strong volume growth expectations, crude oil prices are the critical pathway from robust production and export activity to strong industry cashflows. Between 2011 and 2014, the average annual price for West Texas Intermediate (WTI) was above U.S.$95 per barrel. Between 2015 and 2017, it was below U.S.$53 per barrel. With more substantial volumes and higher prices in 2022, Canada is on track for a record export value in 2022 (surpassing $92.6 billion in 2014). For the forecast horizon, the average annual price is forecast to lie between the highs of 2011-2014 and the lows of 2015-17. For many years, crude transportation was the primary constraint keeping Western Canadian Select (WCS) at a substantial discount to WTI. It stimulated investment in additional pipeline capacity. The commencement of Enbridge Line 3 operations in late 2021 and the Trans Mountain pipeline becoming operational in 2023 Q3 should alleviate market access constraints.

The pipeline constraint for natural gas also persists. Due to transportation costs, Alberta natural gas prices have traded at a discount to Henry Hub (the U.S. benchmark). The primary Nova Gas Transmission Limited (NGTL) system delivers 75 per cent of natural gas exports from Alberta and British Columbia. NGTL bottlenecks have increased price volatility for AECO-C (the Alberta benchmark). The federal government approved two NGTL expansions in 2021 Q2 with a capacity of 1.45 billion cubic feet per day. The in-service dates are 2022 Q4 (the Edson Mainline expansion) and 2023 Q2 (the North Corridor expansion).

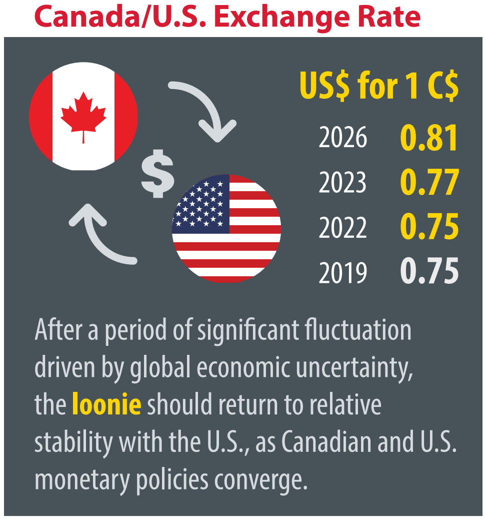
Given the current environment, the average natural gas price for 2023 to 2026 should be higher than during the 2019 to 2022 service plans and budget cycle. The benchmark Alberta natural gas price at the Alberta Energy Company (AECO) hub is forecast to average $5.30/GJ in 2022 before gradually declining to $4.00/GJ by 2027 as pipeline capacity expands. The pricing point AECO-C is a virtual point that has come to mean all gas traded along NGTL under the Nova Inventory Transfer service provisions. The price differential between AECO-C and Henry Hub is expected to ease as increased gas transmission capacity improves.

For the duration of the forecast period, the exchange rate is forecast to average US$0.79 per CAD$. Exchange rate stability would support trade, as trading partners benefit from increased price certainty. Typically, a weak Canadian dollar combined with a strong U.S. economy should boost economic activity in Canada as

Energy Prices



Canada/U.S. Exchange Rate



GDP Growth Comparison

the U.S. is the largest trade partner and export market for Canadian goods. For the oil and gas industry, growth in crude oil and natural gas exports to U.S. markets between 2022 and 2027 is expected to occur. A stable dollar would translate into steady cashflows for businesses in and around the oil and gas industry and support a strong economy.

2. Stable housing investment as volume increase offsets price decline to support municipal residential tax base stability and business investment supports growth

Calgary's 2022 housing and business fixed investment (see glossary) level is at a record high. Both would have substantial contributions to GDP growth. Housing and business fixed investment is forecast to contribute close to half of GDP growth this year. The forecast calls for a decline in spending and investment by the three orders of government in 2023 and 2024 before a return to 2020 levels by 2025. It is attributable to the above trend spending by the federal, provincial and Calgary municipal governments in 2020 in response to the pandemic.

Between 2016 and 2021, through the federal census, only two Canadian provinces increased their stock of dwellings faster than Alberta – Prince Edward Island and British Columbia. For Alberta, the stock of dwellings increased from 1,527,678 to 1,633,220 units. Calgary should have a vital role to play in Alberta's future success. Calgary's housing starts were 12,700 in 2021 after a multi-year low of 7,900 in 2020 because of the pandemic. More recently, activity in Calgary has surged, with an anticipated all-time high of 14,500 housing units started in 2022. Subsequently, the forecast calls for housing starts to decline to an average of about 10,500 units per year for the 2023-2027 period.

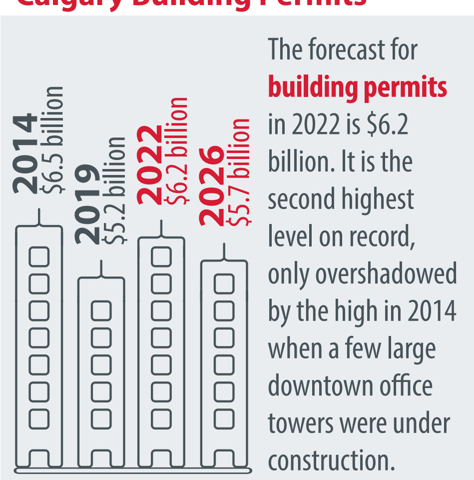
Business fixed investment should continue to grow in 2023 and 2024 primarily due to more robust oil and gas prices in 2021 and 2022, driving the capacity for new investment in plants and equipment. Business investment declined in 2016 and 2017 following the oil and gas industry slump and did not exceed pre-recession levels until 2021. For an extended period, from 2013 Q1 to 2017 Q4, the gradual buildup of 4.0 million square feet of additional office space supply in Calgary's downtown was accompanied by a sustained reduction in demand by 6.1 million square feet. It discouraged future investment. It should limit future investments in the downtown Calgary office market over the next decade to quality improvements or enhancements later in the forecast horizon.

The value of building permits is a valuable aggregate measure of investment intentions over the coming year or two. In 2021, the value of proposed building investments in the city of Calgary was $5.7 billion. Two of every three investment dollars in new buildings get directed at residential properties. For 2022, the forecast calls for an increase to $6.2 billion. It is consistent with the expected acceleration in housing starts. Subsequently, investment intentions would decline, with building permit values expected to average $5.5 billion between 2023 and 2027.

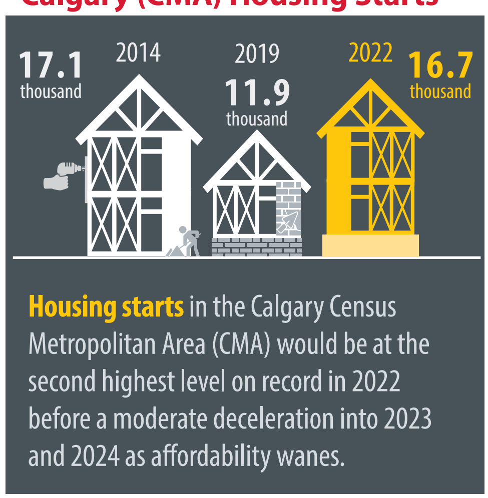
One crucial innovation accompanying the Fall 2022 Economic Outlook is the introduction of the pace of change for the benchmark home price. Unlike the average house price change, which averages across structure types – detached, semi-detached, row houses and apartments – and composition, the benchmark home price uses a consistent structure composition across structure types. In other words, it captures the price for detached, semi-detached, row house and apartment with specific features. In 2022, the benchmark home price is expected to surge by 10.8 per cent. In contrast, the average house price growth is lower at 3.7 per cent. The difference is because lower-priced multi-family units with minimum features will dominate sales in 2022. Price declines in 2023 would be due to homeownership restraint attributable to the sharp increases in interest rates. The overall wealth of residential property owners would stagnate between 2022 and 2023 due to additional units offsetting the price decline. Price growth should resume in 2024, expanding the residential tax base. The forecast is that average and benchmark price growth would converge by 2025.

In 2022, financing costs for new investment projects have been the highest since 2008. At least six interest rate hikes in 2022 should take the prime lending rate from a 2021 average of 2.45 per cent to a 2022 average of 4.0 per cent. In the short term, the Bank of

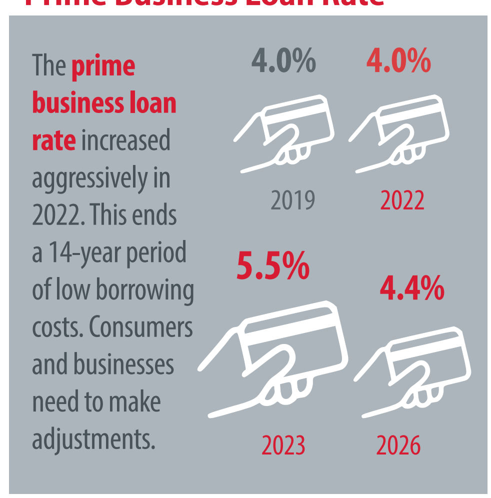
Calgary Building Permits



Calgary (CMA) Housing Starts



Prime Business Loan Rate



Executive Summary

Canada should continue interest rate increases to combat high inflation, leading to a multi-year high prime lending rate of 5.5 per cent in 2023. The forecast is that the Bank of Canada will maintain increases into 2023 before a slight decrease in 2024.

3. Strong population growth and job growth would bring the unemployment rate lower to normal levels, drive business creation, and boost consumption

The April 1, 2022, estimate of Calgary's population was 1.344 million. The annual rate of population increase was about 22,200 people or 1.7 per cent, which is an acceleration from 1.1 per cent in 2021. The implication is that population growth has created the platform for at least a 1.7 per cent growth in personal consumption spending. Personal consumption spending is the main contributor to local GDP growth representing about three out of every five dollars of economic activity in Calgary. Therefore, personal consumption spending would be the most significant contributor to economic growth.

The growth in personal consumption spending should exceed population growth. Two forces are at work – more people and more income. First, sustained high levels of net migration of individuals in the 35 to 44 age group would increase the proportion of the population in the prime income-earning category. This age group continues to dominate population growth. For 2022, population growth due to net migration was 62 per cent (or 13,700 people). Natural increase, the difference between births and deaths, added about 8,600 people. The second is wage growth for the forecast period. However, Alberta's average annual rate of wage growth would lie below inflation leading to negative real wage growth.

Calgary's population is forecast to increase by 110,900 people between 2022 and 2027 (and by 88,000 between 2022 and 2026). The number of elementary and pre-elementary school-aged children (zero to nine years) in 2027 will be unchanged from 2022. It is a consequence of the structure of Calgary's population pyramid. The number of high school youth and graduates eligible for post-secondary education (aged 15 to 19) should increase.

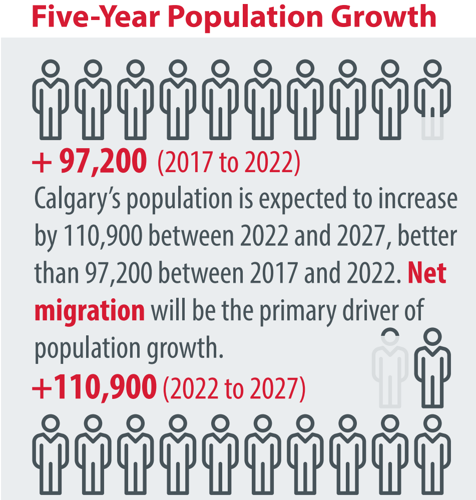
By 2027, the number of seniors aged 65 to 79 should increase by 31,100 relative to 2021. In other words, Calgary's population will age, putting upward pressure on the mean and median age through 2027. Also, by 2027, the population aged 40 to 49 is expected to increase by 37,800 people relative to 2021. The implication is that the share of the retiring population should begin to grow, putting downward pressure on the pace of economic growth.

The Calgary Economic Region (CER) labour force should increase to 986,600 people in 2022. That's a 4.1 per cent increase over 947,800 people in 2021. The forecast average growth rate for 2021 to 2027 is 1.8 per cent because Calgary's labour force participation rate would lead the country. The labour force should hit one million people sometime in 2023. The working-age population should increase at a faster rate. As a result, the labour force participation rate would decline from 70.5 per cent in 2022 to 69.5 per cent by 2027. It would follow the pattern observed for populations experiencing growth in the number of seniors.

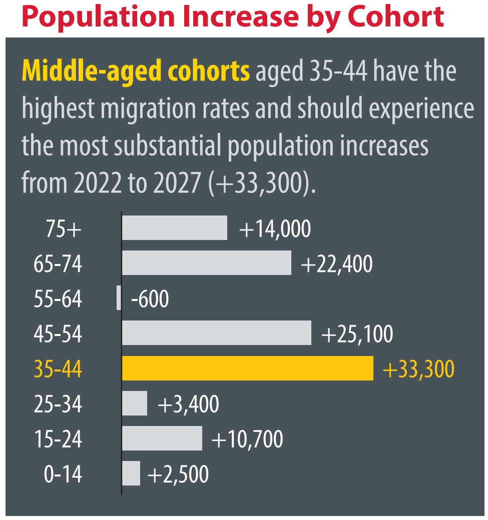
2022 is a banner year for job creation in the CER, with more than 900,000 jobs for the first time in CER history. It is coming off a record year for services-producing sector jobs in 2021. This is despite volatility in the services-producing sector with annual job losses in 2016, 2018 and 2020 alongside gains in 2017, 2019 and 2021. In 2021, the goods-producing sector was still 11 per cent below the 2014 record high. It would not recover these jobs over the forecast horizon. There is an even more substantial intensification of the shift to services-producing sector jobs in Calgary. For the forecast horizon, employment growth should average 2.1 per cent through 2027.

The unemployment rate is forecast to decline to 5.1 per cent at the end of the current service plans and budget cycle (2026). The reason for that is that the average growth rate of jobs should exceed the average growth rate of the labour force from 2021 through to 2027. As a result, the CER unemployment rate should return to levels more typical of Calgary. The last time the unemployment rate was that low was in 2014, before the sharp decline in oil prices.

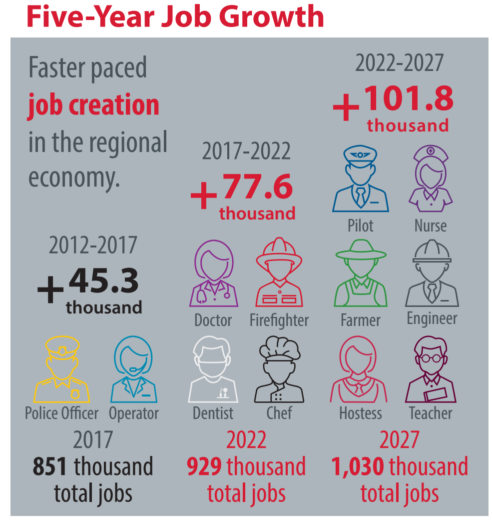
Five-Year Population Growth



Population Increase by Cohort



Five-Year Job Growth



4. Cost pressures are expected to persist and remain higher for consumers than for businesses and governments in 2022 before a switch heading into the next cycle

For Calgary consumers, the sharp rise in the cost of living in 2021 and the first half of 2022 would moderate in the second half of 2022 and into 2023. Specifically, after a 3.2 per cent increase in 2021, the expectation is a significant annual price change for consumer goods and services of 7.2 per cent. Four forces would contribute to the forecast path for the consumer price index for 2023 to 2026.

- Transportation costs would decrease as gasoline and diesel prices decline, microchip-related supply chain disruptions abate, and the cost of fuel-efficient transportation becomes even more affordable.
- Shelter costs of the homeownership variety should decline in 2023. The strength of the rental market would offset the decline. Positive inflation rates would be mostly attributable to increases in heating and mortgage costs.
- Food inflation would dominate in 2023 after taking a back seat to transportation from 2019 to 2022 Q3. A continuation of the Russia/Ukraine conflict will disrupt the supply of agricultural commodities, including fertilizer.
- A relatively stable but slightly stronger Canadian dollar relative to the U.S. dollar should keep prices for imported consumer goods and services ticking slightly higher.

In Alberta, increases in the cost of shelter and transportation have been two of the three most significant sources of inflation in 2022. The price of natural gas for home heating and traveller accommodation led shelter cost increases. For transportation, gasoline and vehicle parts were the most substantial drivers of price increases. As we move forward into the forecast horizon, significant cost pressures should come from food inflation. That's because cost-push inflation should begin to dominate demand-pull inflation.

For businesses, there would be significant upward pressure on labour costs as Alberta wage inflation increases from 1.4 per cent in 2022 to 3.4 per cent in 2023. Wage growth would accelerate further in 2024 as the labour market strengthens. After a massive surge of 32.4 per cent in 2021, producer and raw material price indexes are expected to moderate in 2022 (25.7 per cent) before turning negative in 2023. In short, the cost of doing business will drop in 2023 relative to 2022, in line with the decline in investment activity. As a result, Calgary's businesses will experience some medium-term relief in the pace of growth for operating costs.

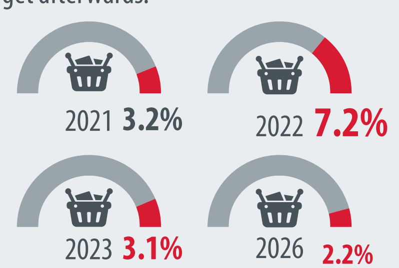
For the municipal government, population growth would drive additional operating cost pressures putting upward pressure on taxes. On the other hand, population growth would be a boon for businesses because of an expanded market for their goods and services and the ability to spread operating cost increases across more consumers.

The cost drivers for private sector capital investment and government investment are different. For the private sector, a useful aggregate measure is the non-residential building construction inflation. From 2021 through 2027, the total increase in non-residential building construction prices should fall slightly above the increase in consumer prices. Upward price pressure would come from increased world oil prices that increase transportation costs to get materials to construction sites. Also, supply-side constraints and the increased cost of material inputs would play a role.

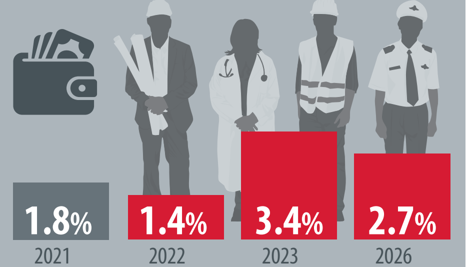
The operating and capital cost pressures on Calgary's municipal government would be lower than consumer inflation in 2022 before moving above it in 2023 and for the rest of the service plans and budget cycle because of increased demand from population growth, raw material price increases, wage pressures, and non-residential construction inflation. Maintaining infrastructure investment and providing frontline services that keep up with population growth will be a balancing act. Sustained provincial government capital funding transfers would ensure public sector investment keeps up with infrastructure needs that accompany higher private sector investments.

Calgary Consumer Inflation

The rate of increase in the **cost of living** would decline from a multi-decade high of 7.2 per cent in 2022 to 2.0 per cent by 2024. It should stay around the inflation target afterwards.



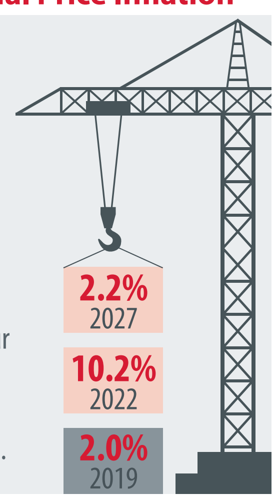
Alberta Wage Inflation



Wage pressure in Alberta would increase significantly. It would lead to a higher average pace of wage growth from 2022 to 2027 relative to 2017 to 2022.

Non-residential Price Inflation

The cost of **non-residential building construction** is projected to stay high over the forecast period as material and labour costs keep up with commodity and consumer inflation.



Executive Summary

Forecast Implications

Averages: Current vis-à-vis Next City of Calgary Service Plans and Budget Cycle

Economic Indicator	Estimate Current Service Plans and Budget Cycle [2019 to 2022] Annual Average	Forecast Next Service Plans and Budget Cycle [2023 to 2026] Annual Average	Forecast Implications
Assumptions			
World			
Real Gross Domestic Product Growth (%)	2.2	3.1	Although the average growth rate of the world economy will be higher in the next service plans and budget cycle than the current one, economic uncertainty has increased. The increase is due to elevated inflation, aggressive interest rate hikes across countries, and geopolitical instability. These headwinds will weigh on consumer confidence and spending in Calgary.
The United States			
Real Gross Domestic Product Growth (%)	1.6	1.5	Demand for Canadian exports will reduce as U.S. economic growth slows down in the next cycle. Canada's energy exports, however, are expected to remain strong due to robust demand and increased transportation capacity.
Canada			
Real Gross Domestic Product Growth (%)	1.1	1.4	With the effects of the COVID-19 pandemic fading away and the energy prices higher, Canada's average economic growth rate will be higher in the next budget cycle, supporting interprovincial trade.
Prime Business Loan Rate (%)	3.3	4.8	Interest rates will stay higher in the next cycle due to rapid rate hikes to tackle inflationary pressures. This will curb investment incentives and household spending and increase The City's borrowing costs.
Exchange Rate (U.S.$ for 1C$)	0.76	0.79	A mild increase in the value of the Canadian dollar in the next cycle will help to limit increases in the cost of imported goods and services.
Alberta			
Real Gross Domestic Product Growth (%)	0.6	2.5	The City's next service plans and budget cycle will be supported by the solid growth in Alberta's economy, as the Province benefits from an improved fiscal situation driven by strong commodity prices.
Total Employment Growth (%)	1.2	2.0	Strong employment growth in Alberta indicates a tight labour market in the province. Employers in Calgary will have a more challenging time finding workers.
Unemployment Rate (%)	8.2	5.1	A lower unemployment rate in the next cycle leads to reduced demand for social assistance programs from The City as the number of unemployed people reduces.
Housing Starts ('000 units)	30.5	34.4	Strong residential investment will contribute to the economic growth within the province, as relative affordability and international migration keep demand robust in the next cycle.
Inflation Rate - CPI (%)	3.1	2.4	Despite persistent inflation in the current cycle due to pent-up demand and volatile energy markets, price pressures are expected to retreat in the next cycle with monetary policy tightening by the Bank of Canada. This will reduce pressure on City expenditures.
West Texas Intermediate - WTI (US$/bbl)	65.8	81.0	Oil prices will remain elevated in the next cycle compared to the current cycle. Volatility is expected, which prompts The City to explore countercyclical fiscal policy options to help moderate the impact of economic fluctuations.
Western Canadian Select - WCS (US$/bbl)	52.3	68.6	Expanded access to markets and higher refining costs for Alberta heavy crude would sustain a lower price difference between WCS and WTI for the next cycle.
Alberta Natural Gas Price - AECO/NIT ($/GJ)	3.1	4.1	Higher average natural gas prices for the next cycle will increase operational costs for businesses and the cost of living for households. Although this will yield higher franchise fees for The City, operating expenditures for some City services will increase.
Industrial Product Price Index (%)	6.3	-0.3	Price growth for finished products will be lower in the next cycle as inflation and production costs subside after 2022, reducing the inflationary pressures for The City.
Raw Materials Price Index (%)	11.9	-1.7	Raw material prices are expected to decline after 2022 and into the next cycle, which will moderate cost pressures for businesses.
Alberta Average Annual Wage Rate Growth (%)	0.9	3.1	Higher wage growth in the next cycle will raise incomes as well as the cost of labour, contributing to inflationary pressure within the province and The City.

Averages: Current vis-à-vis Next City of Calgary Service Plans and Budget Cycle

Economic Indicator	Estimate Current Service Plans and Budget Cycle [2019 to 2022] Annual Average	Forecast Next Service Plans and Budget Cycle [2023 to 2026] Annual Average	Forecast Implications
Forecast			
Calgary Economic Region			
Real Gross Domestic Product Growth (%)	1.1	2.7	While the pandemic-driven recession has created significant economic challenges in the current cycle, stable growth is expected for the region in the coming cycle, supporting recovery in the non-residential tax base.
Total Employment ('000 people)	876.2	977.3	Job growth will bring an increased consumer base and demand for housing in the region.
Total Employment Growth (%)	2.1	2.1	The job growth rate will remain strong in the next cycle, following the elimination of the COVID-19 impact on the labour market.
Unemployment Rate (%)	8.5	5.5	A falling unemployment rate in the next cycle will increase the competition for skilled workers and reduce the demand for social services that support the unemployed. A tighter labour market also indicates increasing pressures on labour costs for The City.
Calgary Census Metropolitan Area (CMA)			
Housing Starts ('000 units)	13.2	13.1	Housing investments in the Calgary area are expected to remain stable in the next cycle as growth in Calgary's neighbouring municipalities stays strong. Calgary faces competition from surrounding areas in attracting housing demand and investments.
Inflation Rate - CPI (%)	3.2	2.4	Following the high inflation of 2021 to 2022, increases in consumer prices will moderate in the next cycle. More stability in the cost of goods and services helps limit the risks of cost overruns and budget adjustments. Moderation of inflation will help Calgarians mitigate the pressures from the rising cost of living.
Non-Residential Building Price Inflation (%)	4.2	1.9	Non-residential construction costs are expected to increase in the next cycle at a slower rate. Recent increases in fuel prices have not yet been passed on to construction projects due to contract delays.
City of Calgary			
Demography			
Total Population ('000 people)	1,314.2	1,399.1	A larger total population means the demand for municipal services would be higher. It also means that the residential property tax base would increase.
Total Population Growth (%)	1.5	1.6	Calgary's population continues to grow steadily, from both natural increase and net migration. When the pandemic finally ends, The City may have to play catch-up to provide services to meet the expectations of the larger population.
Net Migration ('000 people)	10.4	13.5	Following disruptions due to the COVID-19 pandemic in the current service plans and budget cycle, net migration to Calgary is expected to pick up in the upcoming cycle, supporting demand for housing.
Household Formation ('000 units)	7.0	8.6	The higher household formation in the next cycle supports higher demand for residential spaces. It supports a larger residential tax base and increased demand for City infrastructure and services.
Real Estate			
Residential Market			
Housing Starts ('000 units)	11.4	10.5	Slightly lower but stable residential construction activity in the next cycle will support increases in the residential tax base, development and building permit activity, and demand for the continued expansion of City infrastructure.
Calgary Average Residential MLS Sale Price (%)	1.8	1.8	Home affordability in Calgary will remain challenging for new housing market entrants in the upcoming cycle as price growth remains strong. It will, however, increase the supply of new housing units and reduce the pressure on property tax growth for existing homeowners.
Total Building Permits ($billions)	5.1	5.5	Stable growth in residential and non-residential construction, increases in the price of real estate, and higher building permit values in the next cycle will lead to a broader property tax base, higher revenues, and demand for services.

Numbers may not add up due to rounding.

Executive Summary

Forecast Risks

Risks arising from activities in the Rest of the World:

Downside pressure on the global GDP, global commodity market supply shortfall, and the differences in the pace of central bank rate hikes for Canada and the U.S.

1

Global GDP Outlook

Adverse movements in four risk factors put **downward pressure on the global GDP outlook**. The risk factors include the War in Ukraine, the monetary tightening from central banks, the fiscal withdrawal from the governments in most advanced economies (excluding the U.K.), and the slower growth in China due to its continuous COVID-19 lockdowns. Because most of these risk factors remain and a couple have intensified, there is further downside risk, especially for 2022 and 2023.

2

Global Commodity Supply

One of the most brutal conflicts in Europe since the second world war emerged in 2022. The Russia/Ukraine war has disrupted global commodity markets, especially agricultural and energy commodities. The longer the conflict lasts, the greater the duration of the **global commodity market supply shortfall with upside risks for Calgary and Canada.** The longer the conflict lasts, the greater the pressure on the global marketplace to look beyond these countries for supply.

3

The pace of Interest Rate Hikes

The policy direction of global central banks is consistent. However, **variations in the speed of monetary tightening across global central banks create uncertainty**. The consensus is that the central banks acted too late to address inflation, and the need to catch up has led to some divergence. More substantial U.S. Federal Reserve (the U.S. central bank) rate hikes than the Bank of Canada weakens the loonie. The reverse would strengthen the loonie and reduce the cost of imports, which is significant for Calgary.

Risks from policy differences across Canada or policies targeting average conditions in Canada:

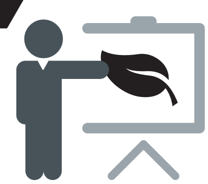
Downside pressure on residential housing investment, different environmental policy preferences, and the rotation from durable goods to services.

4

Housing Investments

The significant 2022 interest rate increases to combat high inflation in Canada have put significant **downward pressure on residential housing investment** activity. Because the prime lending rate that drives variable mortgages is now at the highest level since 2008, affordability has worsened. Housing markets in Vancouver and Toronto would fare worse. It is motivating new policies to tax house-flippers and non-resident-owned vacant homes.

5



Environmental Policy Divergence

There is a risk of heightened tensions between federal and provincial governments on environmental policy and the pace of policy implementation. **Environmental policy divergence between municipal, provincial, and federal governments creates business uncertainty**. Higher gasoline prices have been a key factor in higher inflation, drawing attention to higher federal carbon taxes. Government finances have strengthened, but the future of environmental policy across governments is ambiguous.

6

Increased Demand for Services over Goods

Canada is experiencing a rotation out of durable goods spending and toward spending on services. It is driven by pent-up demand for services as a result of the pandemic. As the demand for recreation, entertainment and travel increases into 2023, there are tailwinds for the Canadian economy. It creates **upside potential for the Canadian economy**. Economic activity in Canada's large cities, including Calgary, would benefit from the boost.

Risks from potential changes in Alberta provincial government policies:

The uncertainty associated with the ability to overcome labour shortages, increased capacity for energy sector exports, and the level of capital funding for Alberta municipalities

7

Oil and Natural Gas Exports

Crude oil prices have pulled back from the peak in the first half of 2022. The June 2022 average price for WTI was around $110 per barrel compared with below $85 per barrel in September 2022. The Trans Mountain pipeline will become operational in 2023, and the expansion of the NGTL system for natural gas due for completion in 2023 provides **upside potential for energy exports**. It creates the scope for expanded energy sector profitability without significant volume shifts simply because of the lower price discount for energy commodities. The improved fortunes of the sector bode well for other Calgary industries.

8

Labour Shortages

Job creation has accelerated in 2022, with a significant 9.4 per cent year-over-year rate by September 2022. At the same time, the job vacancy rate has also started to accelerate. There is uncertainty about Alberta's capacity to attract the skillsets needed to fill emerging vacancies. It **may require government policy responses to ensure that the workforce needed to drive economic growth is available to employers**.

9

Infrastructure Spending

Investment by the three levels of government in Calgary is expected to decline because a **decrease in capital spending dollars through the provincial government creates downside risks**. The stimulative effect from a COVID-19-related stimulus program would run its course. Also, the Government of Alberta's local government fiscal framework with substantially lower levels of infrastructure investments would kick in. The silver lining is continued investment in the Green Line.

Risks from local and regional private and public-sector influences:

The potential for a lower level of private (non-residential) investment, a significant workforce and consumer market boost from immigration, and uncertainty associated with wage pressures.

10

Private (Non-residential) Investment

Although fast-paced economic growth has returned to Calgary, many Calgary businesses are not investing in expansions as they did previously. Proposed investments have caution underlying them, as reflected in non-residential investment intentions. In the near-term, non-residential investment intentions would remain lower than the $2.2 billion high recorded for building permits in 2017 through 2027. **There are downside risks if the level of business investment caution persists**.

11

Immigration Boost

The forecasted growth in population is 110,900 people from 2022 to 2027. The population aged 35 to 49 should increase by 48,400. That's four out of every nine new Calgarians in that age group. Most of the lift would come from inter-provincial and international immigration. These individuals would expand the workforce and generate income to boost consumer spending and the overall level of economic activity. If economic conditions elsewhere in Canada remain lower than in Calgary for longer, **there is an upside risk to the level of net migration to Calgary**. It would strengthen economic growth.

12

Wage Pressures

The average annual rate of wage growth during the 2019 to 2022 service plans and budget cycle was 0.9 per cent. Higher wage growth would arise in the next budget cycle. **Wage growth increases economic uncertainty**–households' incomes would increase, but the cost of labour for businesses and governments would raise costs. Wage pressure will soon weigh on contracts. The ability to avoid an inflation wage spiral will sustain positive economic growth for longer.

Forecast

The Local City of Calgary Economy

The Sources of Economic Growth in Calgary

Calgary recovered and surpassed the pre-pandemic level of personal consumption expenditure in 2022. Close to half of the increase in regional economic growth is due to more Calgarians consuming more goods and services. The above trend growth in 2022 is attributable to double-digit growth rates in two investment categories – residential investment and investments in plants and equipment to drive future growth. However, there is a decline in government investment and spending in 2022 relative to 2021 because of the withdrawal of COVID-19-related stimulus.

Trade is another important source of growth. In 2021, 60.8 per cent of the value of total international goods exports from establishments based in Calgary was from the natural resource sector. High oil prices in 2022 have benefitted Calgary oil exporters. Completing the Trans Mountain pipeline expansion in 2023 will also contribute to continued export volume growth over the next several years.

The latest (2021) Federal Census showed that the city of Calgary made up 82 per cent of the regional population. Therefore, a helpful rule of thumb is to consider that at least five out of every six dollars of economic activity generated in the region is attributable to the city of Calgary.

The Contribution of Private and Public Investments and Impact on Construction Inflation

Non-Residential Activity – Significant Public Investment to complement Private Investment

Downtown office vacancy rates will remain very high in 2022. As a result, future investments in the downtown Calgary office market over the next decade will be limited. However, enhancements later in the forecast horizon that improve the quality of offerings could occur. The current focus is on office-to-residential conversions supported by The City's Downtown Calgary Development Incentive Program. As a result, the downtown Calgary office vacancy rate should decline gradually throughout the forecast period. Greater than anticipated success with programs targeting the downtown offer the prospect of an even faster rate of decline.

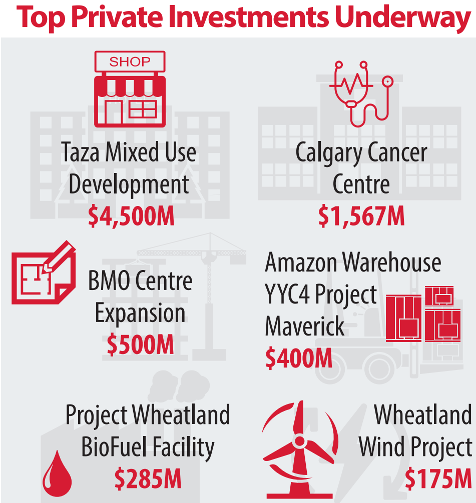
Non-residential building construction investment is expected to increase in 2022 relative to 2021. Many Calgary businesses are not investing in expansion as they did previously. The most recent record high for non-residential building construction investment was just above $2.2 billion in 2017. At the time, investments in a few downtown office towers were underway. Total non-residential building construction investment should increase from about $2.0 billion in 2022 to about $2.2 billion by 2027.

Another category of investment is public sector investments in infrastructure. Future investments would be affected by the provincial government's plan for capital spending beyond significant investments in the West Bow River Bridge by Alberta Transportation. Public sector infrastructure investments support local economic activity. Transportation engineering construction, for example, on road infrastructure investments, like the Southwest Ring Road and Calgary Airport Trail Expansion (Phase 2), generate more than $3 in local GDP for every dollar spent. It is an example of the 'multiplier effect' associated with public infrastructure investments.

Non-Residential Construction Price Inflation – Impact on City Costs

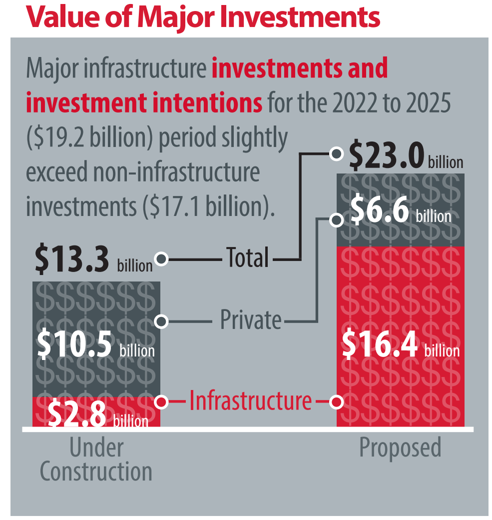
Non-residential construction price inflation captures the value of all materials, labour, equipment, overhead and profit to construct a new building. Any rush to get multiple building construction projects going on at the same time risks causing inflation because of higher cost inputs into the local economy. A balance between the pace of private investment and public infrastructure would limit inflation through increases in material and labour costs.

Top Private Investments Underway



Top Public Investments Underway

Value of Major Investments



In 2022, The City of Calgary, directly or through its civic partners, is planning for new infrastructure investments through the 2023-2026 capital budget. Approvals are expected later in the fall. A positive impact on the local economy will follow. In Alberta and Calgary, public sector investment typically fluctuates between nine and 16 per cent of private sector investment in any given year. Ideally, public sector investment should be countercyclical. In 2022, City Council approved incorporating countercyclical actions for the 2023-2026 period. The practice would help moderate non-residential price inflation by easing the demand for material and labour inputs over time.

The analysis of non-residential construction prices in Calgary indicates that recent diesel fuel price increases are only partially incorporated into commercial construction contracts. As a result, the forecast calls for prolonged increases in construction costs in Calgary as fuel price inflation enters construction contracts over the next few years. This will impact the costs of all construction in Calgary. Residential construction will also experience similar pressures.

Several factors are expected to drive the trajectory for non-residential construction price inflation. First, upward pressure on the prime lending rate and other interest rates from the Bank of Canada's monetary policy actions would increase the cost of doing business in the near term. It is driving a significant price increase for 2022. Second, cooling energy costs and material expenses will moderate future inflation in 2023 and beyond. Third, wage pressure will soon weigh on contracts. It will compel builders to substitute away from more skilled labour and toward less skilled labour to manage those costs. The challenge for project managers will be ensuring quality in an environment with fewer skilled workers on site.

Residential Activity – Building Investment and Expansion of the Residential Tax Base

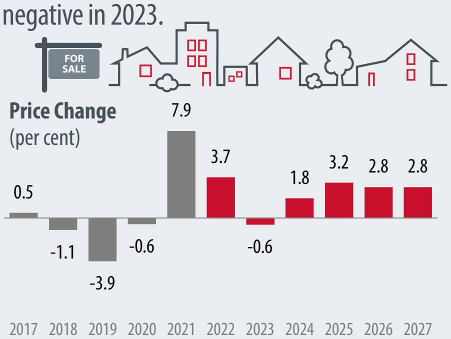
The 2021 Federal Census results from earlier this year showed that increases in the number of dwellings in Canada over five-year intervals reversed the decelerating trend for the first time since 1991. Between 2011 and 2016, there was an addition of 751,465 units. Now, for the 2016 to 2021 period, there was an addition of 906,862 dwelling units. Only two provinces had a faster rate of intercensal growth than Alberta (6.9 per cent) – Prince Edward Island (8.6 per cent) and British Columbia (8.5 per cent). For Alberta, additions to the stock of dwellings over 5 years decelerated from 137,403 (2016) to 105,542 units (2021). Calgary has a vital role to play in Alberta's future success. In 2021, 12,700 housing units were started in the city of Calgary. It is comparable with the recent record high of 13,800 units in 2014. Between 2017 and 2020, Calgary averaged 9,300 units. For 2022, the 14,500 units of housing starts expected is a new record high. Subsequently, the forecast is for housing starts to moderate to an average of about 10,500 units per year for the 2023-2027 period. It points to further acceleration in Calgary.

The value of building permits is a helpful measure of investment intentions over the coming year or two. In 2020, in the throes of the recent recession, the value of proposed building investments in the city of Calgary was $3.4 billion. It increased sharply to $5.7 billion in 2021. Two out of every three dollars gets directed at residential property construction. The execution of some of the investments would occur in 2022 due to the time required for completion. For 2022, the forecast calls for an increase to $6.2 billion. It is consistent with the expected acceleration in housing starts and the shift to multi-family units. Subsequently, investment intentions would decline, with building permit values expected to drop to $5.2 billion in 2023. From 2024 to 2027, the forecast average is $5.6 billion annually. Residential investment should continue to dominate non-residential investment.

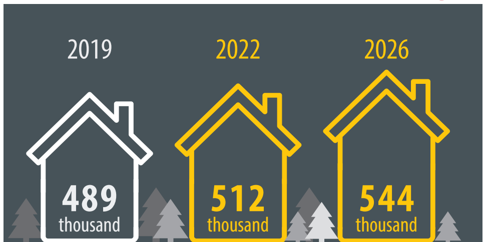
The average house price would increase for the second straight year in 2022 by 3.7 per cent. A significant driver is strong job growth in 2021 and 2022. In the recent past, the changes in the average resale price (-0.6 per cent in 2020) and benchmark price (-0.8 per cent in 2020) were very close. However, starting in 2021, a difference has emerged. The benchmark price increased sharply in 2021 and should do so again in 2022, rising by 10.8 per cent. The difference is because of a surge in sales of units with fewer features, making them cheaper. By the end of the forecast period, the difference will get eliminated as the sale of housing units rebalances to standard features.

Average Residential MLS Price

House price appreciation would occur for the second consecutive year in 2022 after three years of decline. The pace of growth should turn negative in 2023.



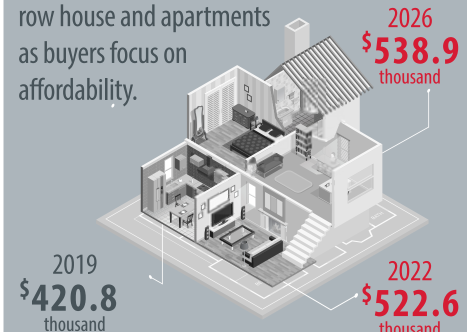
Occupied Residential Dwellings



There are now more than **half a million occupied residential dwellings** in Calgary. Demand for municipal services will grow with further increases over the forecast horizon from 2022 to 2027.

Benchmark House Price

House price appreciation would be stronger for the benchmark home in each category: single-family detached, single semi-detached, row house and apartments as buyers focus on affordability.



The Contribution of Private Consumption and Upward Pressure on Municipal Services

Local Population Growth to Support Growth of Personal Consumption Expenditure

Calgary's population estimate for April 1, 2022, was 1,343,500. The annual rate of population increase was 22,200 people or 1.7 per cent, which is an acceleration from 1.1 per cent last year. It means that the contribution of personal consumption to local GDP growth should accelerate in 2022. Sustained high levels of net migration of individuals in the 35 to 44 age group continued to drive population growth. They accounted for 36 per cent of 2022 population growth. Net migration was 62 per cent (or +13,700 people). The natural increase added 8,600 people.

The 2022 population forecast update sustains the trend of a gradually declining natural increase in Calgary. The number of births in Calgary has recently dropped from 16,300 in 2017 to 15,600 in 2020. Separately, the primary driver is the increased deaths of those in the baby boomer population. The annual death count should increase from 7,100 in 2021 to 8,300 in 2027. Consequently, the natural yearly increase would decline from 10,100 people in 2017 to 8,300 people in 2027. For the forecast horizon, net migration would continue to account for most (62 per cent) of the population increase from 2022 to 2027. More robust economic growth in Calgary relative to the rest of Canada would translate to more new residents from other provinces getting attracted to Calgary. As a result, this would increase the average annual level of net migration to 13,700 people between 2022 and 2027.

The population forecast was completed before the recent wave of immigrants from Ukraine. The Spring 2023 Economic Outlook will investigate the impact on Calgary's population more thoroughly.

The Shifting Age Structure to Impact City Services

Calgary's population age structure would shift from 2022 through 2027. While Calgary's population should increase by 110,900 people, a lot of the increase is forecasted to occur in the 40-44 age group (22,700) and the 45-49 age group (15,100).

The number of elementary and pre-elementary school-aged children (zero to nine years) would stagnate, with implications for service providers that focus on this age group. The number of high school youth, including those high school graduates eligible for post-secondary education (aged 15 to 19 years), should increase yearly during the forecast horizon. By 2027, the number of seniors aged 65 to 79 should increase by 31,100 relative to 2022. Also, by 2027, the population aged 40 to 49 should increase by 37,800 compared to 2022. The implication is that growth in the share of the working and saving population, usually a boost to economic prosperity, would increase in the short term. It means that Calgary would continue to reap demographic dividends.

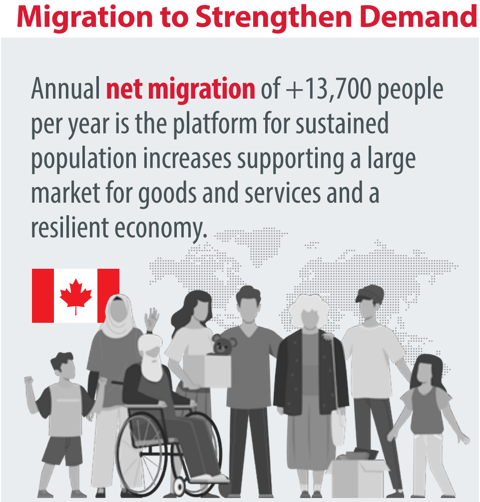
The Path of Consumer Price Increases and the Pressure on Municipal Spending

Consumer Price Inflation in the Calgary Census Metropolitan Area (CMA)

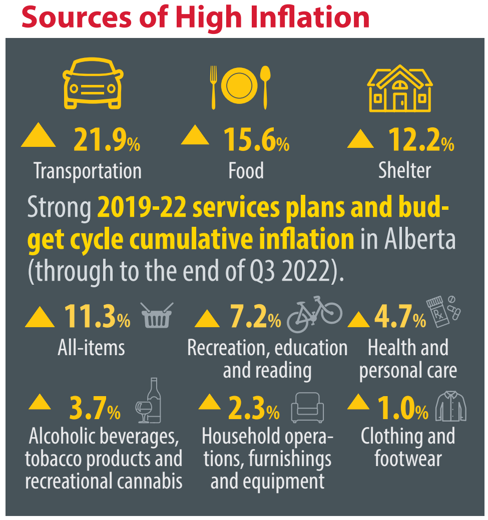
Following the initial impact of the COVID-19 pandemic in 2020, consumer demand for goods and services rebounded in 2021. However, continued pandemic-related challenges, extreme weather events, and other disruptions meant that supply could not keep up with demand. The mismatch of supply and demand led to increases in the prices of goods and services in 2021, as measured by the consumer price index. Increases in the cost of transportation, food and shelter have been the most significant sources of inflation in 2022.

In the face of a series of steep interest rate hikes by the Bank of Canada throughout 2022, inflation should moderate slightly during the final months of 2022. However, the annual average inflation rate for 2022 should be 7.2 per cent, which would be Calgary's highest annual inflation rate since 1982. Inflation in the Calgary CMA would moderate to a rate of 3.1 per cent in 2023. However, 2023's average inflation would still exceed the Bank of Canada's inflation-control target range of 1 to 3 per cent. In 2024, inflation should return to near the midpoint of the target range at 2.1 per cent and remain close to 2 per cent throughout the remainder of the forecast horizon.

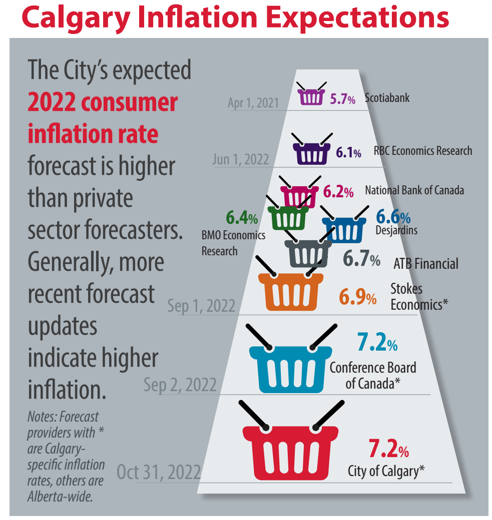
Migration to Strengthen Demand



Sources of High Inflation



Calgary Inflation Expectations



Forecast

The Broader Regional Economy (Calgary Economic Region)

The Pace and Magnitude of Economic Output Growth

The duration of the average business cycle is getting longer at the national level. Until COVID-19 broke the rhythm, Canada recorded the second most prolonged period of economic expansion since 1926. It is an outcome of federal authorities' deployment of successful fiscal and monetary policy responses. They have been active at managing average conditions but not regional variations. While Canada has had one business cycle over the last ten years, the CER and the province of Alberta have had to contend with one more. Unlike the rest of Canada, the CER and Alberta experienced a slowdown in 2015-2016 due to a sharp decline in global energy prices.

The regional economy has closed out the 2019-2022 service plan and budget cycle with fast-paced economic growth. Although annual Statistics Canada estimates are not due for a few years, estimates are available from private-sector forecasters. Stokes Economics' September 2022 forecast update indicated that the Calgary Economic Region grew by 3.9 per cent in 2021 and should grow by 4.7 per cent in 2022. Estimates from other private-sector forecasters are different. Oxford Economics (for the CMA) and the Conference Board of Canada (also for the CMA) suggest economic expansion at a faster pace. Their 2022 projections are growth rates of 6.6 and 6.3 per cent, respectively. The City's 2022 corporate forecast for the CER puts economic growth in line with the average of other private-sector forecast estimates. More generally, the pace of growth after the COVID-19-induced recession is much faster than the pace when Calgary rebounded from the 2015-2016 recession.

Using City of Calgary estimates, after real GDP growth of over three per cent in 2021, economic activity picked up pace in 2022, with real GDP growth expected at 5.2 per cent. Real GDP growth is close to Alberta's 2022 growth of 5.3 per cent. It means that regional and provincial economic growth would be similar in 2022. However, the situation is different at the national level. Canadian economic growth should reach 3.3 per cent in 2022. Canada's economy is facing headwinds in 2022 from high global commodity prices and rising interest rates.

On the other hand, Alberta and Calgary, home to a significant oil and gas industry, will benefit from high energy prices in 2022. As a result, CER growth should gradually taper in 2023 and beyond as the bounce back from the pandemic wraps up with the economy settling into a more sustainable long-term growth path. After growing by 3.4 per cent in 2023, real GDP growth should soften to an average of 2.4 per cent between 2024 and 2027.

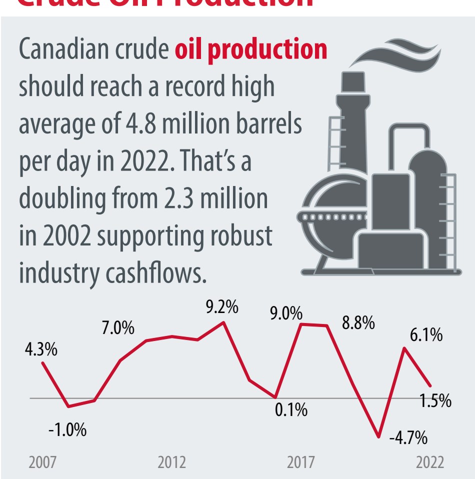
Contribution to CER Economic Expansion

Increased Public Infrastructure, Oil and Gas, and Net Zero Investments

Major investments ($5.0 million or more) underway in Fall 2022 for the CER across nine sectors would cost about $13.3 billion to complete. Another $23.0 billion in major investments should commence later in 2022 or by no later than 2024. The total short-to-medium-term investment in major projects is $36.2 billion. Proposed investments are higher than investments underway and would contribute to future growth.

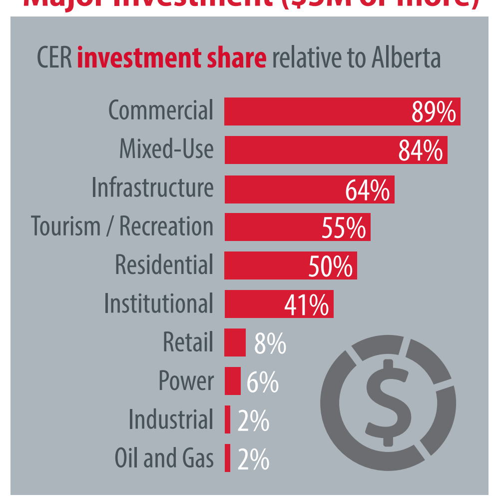
The CER would be home to more than half of Alberta's private sector investments in four categories – commercial property (89 per cent), mixed-use (84 per cent), tourism or recreational (55 per cent), and residential investments (50 per cent). In these four categories, projects (underway in 2022 or to commence by no later than 2024) would cost $16.9 billion in investment dollars. An interesting new private-sector investments would require at least a billion dollars – an Energy Park Renewable Natural Gas and Ethanol Project. It should be North America's largest carbon negative renewable natural gas and ethanol project slated for construction between 2023 and 2025.

Crude Oil Production



GDP Growth

Major Investment ($5M or more)



Municipal, provincial and federal infrastructure investments, including partnerships with the private sector, underway or proposed, in and around the CER should cost about $19.2 billion. The multi-billion-dollar investments include the Green Line LRT and the Southwest Calgary Ring Road project. New additions to proposed infrastructure investments include the Edmonton-Calgary High-Speed Rail Line and the Calgary-Banff Rail Link with touchpoints in the CER.

Alberta investment activity is forecast to strengthen over the 2022-2027 period. There are 603 major projects on the books, with 346 already underway by September 2022, and 257 should commence by no later than 2024. Seventy-two of these projects are yet to provide their complete cost estimates to the Government of Alberta. An update on those would accompany the Spring 2023 Economic Outlook. Capital projects already underway are expected to cost $80.0 billion (up from $55.2 billion in the Spring 2022 Outlook). Projects that would begin later in 2022 or by no later than 2024 would cost $82.0 billion (down from $131.1 billion in the Spring 2022 Outlook). It's a downward revision of investment intentions (from $186.3 billion to $162.0 billion).

Oil and gas and pipeline projects account for 42 per cent of projects underway or proposed in Alberta. These projects would occur outside the CER. However, businesses with headquarters in the CER will initiate them. The two most substantial proposed private sector investments are the Pathways Alliance Carbon Capture Storage Hub – Phase 1 ($16.5 billion), Suncor Base Mine Extension Project ($4.4 billion) and the Nauticol Energy Net-Zero Blue Methanol Project ($4.0 billion). The latter project plans to produce blue methanol by harnessing natural gas using carbon capture and sequestration. One of the two most substantial private sector investments under construction is the Trans Mountain Pipeline Expansion ($21.4 billion). So far, the project has hired as many as 18,800 people. The other is the province-wide TELUS Infrastructure upgrades ($16.0 billion).

Services-Producing Sector Job Growth to Drive Economic Expansion

A healthy job market sustains economic expansion in at least two ways. First, there is a volume boost to goods and services produced. Second, it creates a robust demand for goods and services, given household consumption's vital role in regional economic growth. The CER labour force should increase to 986,600 people in 2022, from 947,800 in 2021. That's a growth rate of 4.1 per cent because of a return to work for many following the worst of the pandemic, so that Calgary's labour force participation rate would lead the country. The labour force should hit one million people by 2023. The working-age population should increase at a faster rate in 2022 and 2023. However, Calgary is not immune to the recent upsurge of retirements by baby boomers in the post-COVID-19 job market. As a result, the labour force participation rate would decline from 70.5 per cent in 2022 to 69.5 per cent by 2027.

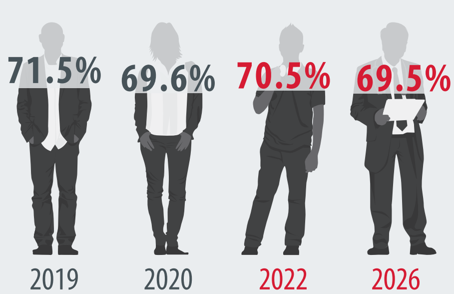
Fast-paced job growth has returned to the CER with a 3.3 per cent (2021) and 7.7 per cent (2022) annual rate of job creation. The services-producing sector is driving recent annual job growth with a pace of 3.6 per cent in 2021. On the other hand, the goods-producing sector remains below pre-pandemic levels.

The 2022 pace of job creation in the CER should exceed 2021. The economy should add 35,600 net new jobs. It is a significant increase from 27,800 net new jobs in 2021. During the next service plan and budget cycle (2023-2026), most job growth should arise from the services-producing sector. The goods-producing sector would be relatively unchanged in 2026 from 2022. By the end of the forecast period, goods-producing sector jobs would be less than the 2014 peak. A transformation in the skills needed in the new economic environment continues to be at work.

A steady average annual pace of growth of services-producing sector jobs would occur through to 2027. It would offset a much slower average annual pace of goods-producing sector job growth. The unemployment rate is forecast to decline to 5.1 per cent at the end of the current service plans and budget cycle (2026). The drop from the beginning of the cycle (2023) is because the average job growth (+2.1 per cent) should exceed the average labour force growth. After seven years of high CER unemployment rates (i.e., above 6 per cent), the CER job market would improve. The forecast assumes economic and employment growth would be slightly more robust in Calgary than elsewhere in Canada due to strong energy prices.

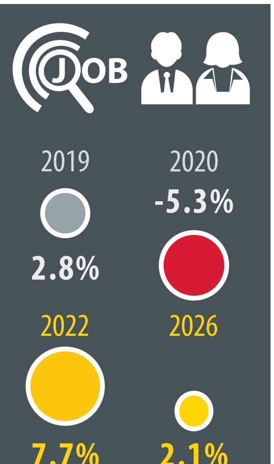
Labour Force Participation

The forecast for the **labour force participation rate** is a decline as baby boomers exit the workforce.



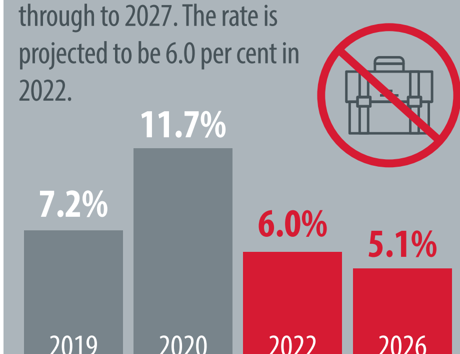
Annual Job Growth

After a COVID-19-driven job decline in 2020, **annual job growth should rebound significantly to 7.7 per cent** in 2022. It should decelerate to just above 2 per cent for the remainder of the forecast period.



Unemployment Rate

The **unemployment rate** is expected to continue its course toward lower levels through to 2027. The rate is projected to be 6.0 per cent in 2022.



Forecast

Commodity Prices - Local & Regional Economy Impact

Energy Commodity Prices

Energy Commodities

Crude Oil: Global oil markets have faced significant uncertainty for most of 2022. The year began with tempered oil demand expectations due to the surge in Omicron cases, many working from home and reduced air travel. The inability of the Organization of the Petroleum Exporting Countries (OPEC+) to achieve output targets led to a 16 per cent rise in West Texas Intermediate (WTI) in January 2022. The lingering geopolitical tension between the third largest producer of crude oil, Russia, and Ukraine, only worsened an already volatile market. Production constraints and sanctions placed on Russia saw countries drawing on their inventories to meet energy demands. As a result, Russia reduced oil supplies by approximately one million barrels a day in April 2022, driving down global supply. To start the year, oil inventories in Organisation for Economic Co-operation and Development (OECD) countries were at their lowest level over the past seven years.

Looking ahead, the price of oil should decline toward the end of 2022 and heading into 2023 but remain elevated. Despite fears of a slowdown in economic growth and demand due to global inflation, supply chain disruptions and geopolitical tension, demand remains high heading into 2023. In addition, China's rebound from the COVID-19 outbreak and seasonal demand factors would bolster demand. The pre-COVID high was 99.7 million barrels per day in 2019. After a sharp fall to 91.0 million barrels per day in 2020, it has continued to increase and should surpass the pre-COVID high by 2023.

Global oil supply, meanwhile, is expected to ramp up only slightly into 2023. Three factors dominate. First, the OPEC+ agreed to produce an additional 100,000 barrels daily in September, suggesting a preference for limited supply growth. Second, European Union leaders agreed in May to sanction Russia by placing an embargo on oil supply from Russia by the end of 2022. Third, there are production capacity constraints for non-OPEC+ countries.

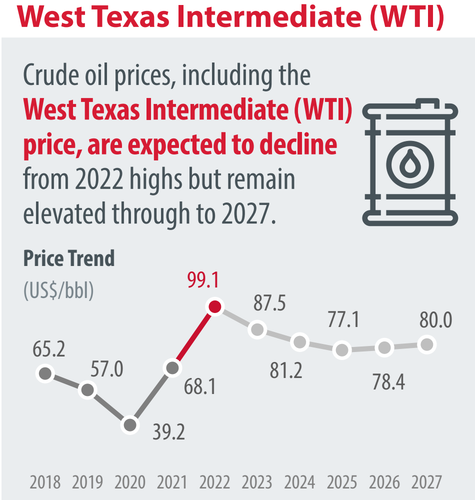
WTI prices should average US$99.1 per barrel in 2022 and decline by 12 per cent in 2023, averaging $87.5 per barrel during the year. Between 2024 and 2027, WTI prices would average US$79.1 per barrel. Western Canadian Select (WCS) prices should follow a similar pattern, increasing to US$83.2 per barrel in 2022 from the previous level of US$55 per barrel in 2021. However, this should drop to an annual average of US$72.2 per barrel in 2023, averaging US$67.9 per barrel between 2024 and 2027.

The negative sentiment on oil supply should translate into a narrower WTI-WCS price differential between 2022 and 2024. The Spring 2022 Economic Outlook expectation was an average price differential of US$17.3 per barrel for 2022. This has been revised downward to US$15.9 per barrel. Expanded pipeline capacity with the completion of the Trans Mountain Expansion Project should increase capacity by 590,000 barrels per day. It would further narrow the price differential to an annual average of US$15.3 per barrel in 2023.

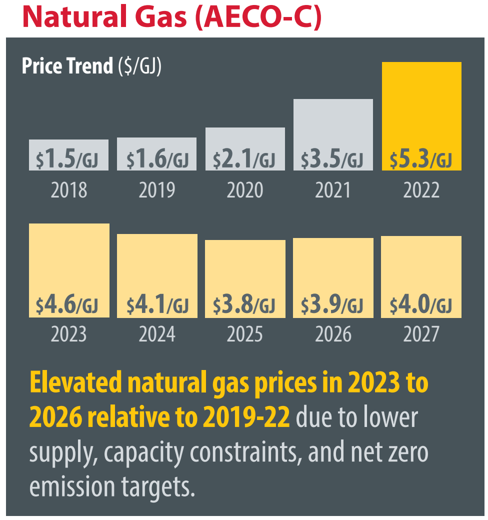
Natural Gas: After the pandemic-related demand decline in 2020, global natural gas demand grew by 4.4 per cent in 2021. Over the same period, natural gas production increased by 4.2 per cent. Faster growth in global demand combined with seasonal factors (winter season) led to a tight natural gas market and rising energy prices at the start of 2022. The Russia-Ukraine conflict worsened an already tight market due to an even lower energy supply.

Specifically, the European Union (EU) announced plans to reduce gas imports from Russia by two-thirds within a year. Russia, in

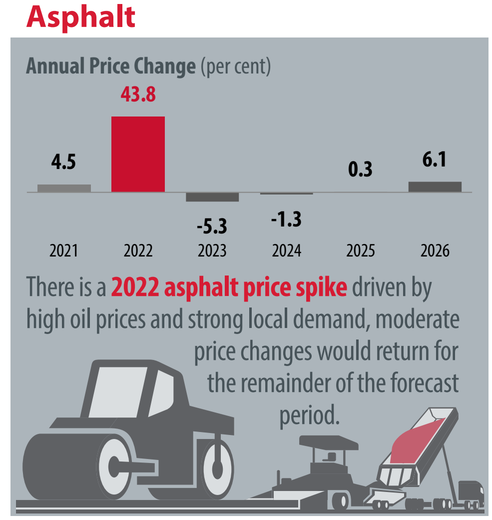
West Texas Intermediate (WTI)



Natural Gas (AECO-C)



Asphalt



response, began delivering less gas to Europe in July, reducing gas supply dramatically and the capacity of the Nord Stream 1 pipeline to one-fifth of its capacity. In September, Russia announced that supply through the Nord Stream 1 pipeline would be shut down. Despite North American (U.S. and Canada) and Middle Eastern capacity to expand gas production, it may not be enough to offset the drop in Russian natural gas supply.

Elevated natural gas prices should persist for 2022. Higher prices would sustain the interest of producers to invest in more production capacity. AECO-C natural gas prices should rise to $5.3 per gigajoule in 2022 from $3.5 in 2021. Over the forecast horizon, efforts to reduce greenhouse gas emissions through the energy complex would provide an offset. It would keep demand growth flat and put downward pressure on prices. AECO-C natural gas prices should drop to $4.6 per gigajoule in 2023 and average about $3.9 per gigajoule between 2024 and 2027.

Building and Construction Commodity Prices

Asphalt: Asphalt prices spiked a bit more than expected in summer 2022. High oil prices, high local demand, and high general inflation enabled producers to pass on price increases. The carbon tax impact on Asphalt markets is a chief component of price increases. However, as market players adjust by changing production, sequestering projects and purchasing offsets, it will partly offset the impact of the carbon tax on a per ton basis. The implementation of these adjustments will take some time. The combined effect is that asphalt prices have taken a permanent and significant jump in 2022 and should hover around the current price level for the duration of the forecast, despite the expectation of lower oil prices.

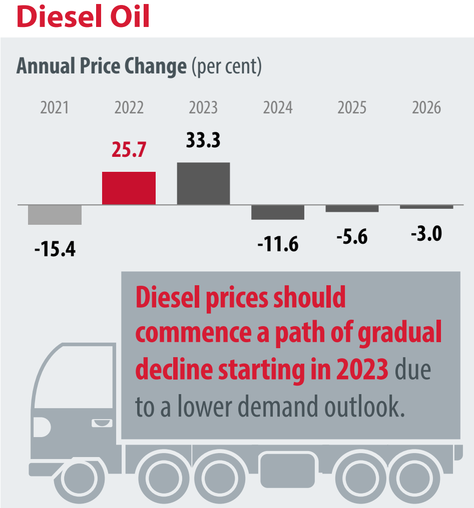
Diesel: During the pandemic, people saved money. From summer 2021 to summer 2022, the demand for goods increased as the impact of the pandemic waned. The demand for diesel fuel also increased with the increase in transportation needs. It has led to a significant price increase for 2022. In fall 2022, oil prices are dropping, and prices for both gasoline and diesel have started to drop. Overall, the outlook for diesel demand is down. Yet, prices will only slowly reflect that decrease in demand because of three factors. They are market uncertainty caused by the ongoing Russia/Ukraine war, newly announced price maintenance OPEC+ oil output restrictions, and planned increases in Canadian carbon taxes. The near-term outlook is for these three factors to limit the impact of falling oil prices on diesel markets.

Raw Materials

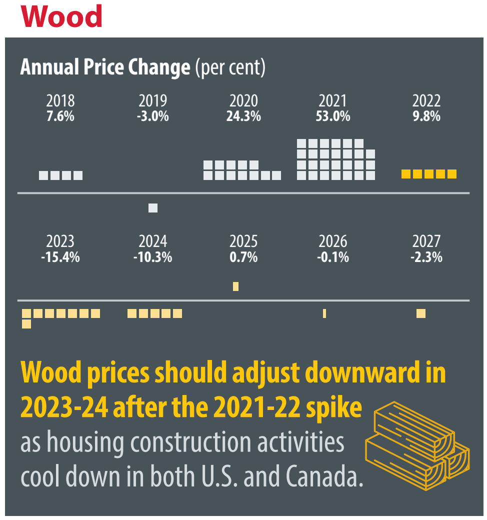
Wood: For over 25 years, U.S. softwood lumber producers have complained that Canadian "stumpage fees" are lower than in the U.S. and represent an unfair trading practice. In the U.S., forests are harvested from private land, whereas in Canada, they get harvested from public lands. Nevertheless, Canadian governments loathe increasing fee revenue. So instead, the U.S. collects higher tariffs. The U.S. has proposed a change to tariff rates, and Canada is appealing again. It creates an element of uncertainty in the future path of prices. Pending the outcome of the current appeal, U.S. housing construction activity would be the primary demand driver for Canadian lumber. U.S. housing construction activity was up in the first half of the year. Recently, rising interest rates have cooled construction intentions. In Canada, prices peaked in May 2021 and have dropped about 60 per cent since. Slower housing construction activity driven partly by rising interest rates should soften U.S. and Canadian demand for softwood. Currently, the Canadian domestic lumber market is over-supplied. Retail prices have remained sticky in 2022 but should relent in 2023 and 2024.

Rubber: Increased military demand and reduced consumer demand due to the summer's global drought offset each other in 2022. New drivers of the future price path have emerged. Droughts caused lower electricity production in China, which led to electricity rationing. As a result, some manufacturers partially idled.

Diesel Oil



Wood



Rubber

The continued Chinese policy of Zero Covid is an important factor influencing rubber demand in China, which is the world's largest rubber consumer, has reduced demand. Lower supply and demand have changed the overall market size. As we advance, there are forces pointing toward lower demand. Specifically, due to the ongoing Russia/Ukraine conflict, European energy shortages are limiting growth in rubber demand in Europe. With lower demand and oil prices softening, the near-term outlook is further reductions in rubber prices in 2023 and 2024. As the Russia/Ukraine crisis subsides and energy issues in Europe abate, modest price increases are expected to follow in 2026 and 2027.

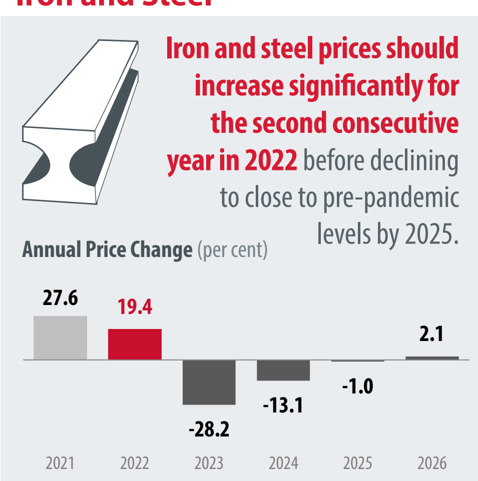
Metals and Minerals

Iron and Steel: I: In fall 2022, iron ore prices are about 10 to 15 per cent above where they were just before the pandemic began. That's a significant shift from a surge in 2021 and early 2022. Global demand has fallen recently. Four factors are primarily responsible. First, a drought this past summer in China dried up rivers used for hydroelectric energy. It led the Chinese government to ration electricity, thereby limiting production activity. The second is increased efforts toward de-carbonization, intensifying demand for alternative construction materials. The third is the overall slowing Chinese economy. The fourth is significantly higher U.S. and global interest rates that have negatively hampered iron ore in the futures markets. Consequently, the general outlook for iron is down considerably. Iron ore price reductions will take a couple of months to work down to finished iron construction materials like steel. The near-term outlook is for iron prices to drop to levels which are only slightly above pre-pandemic levels. It is a relief as spot ore prices spiked to 125 per cent above pre-pandemic levels at the height of pandemic lockdowns.

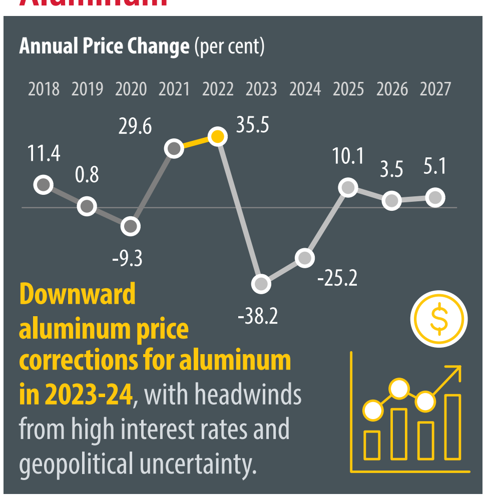
Aluminum: Since the start of the invasion of Ukraine in 2022 Q1, aluminum prices have steadily faltered. By 2022 Q3, high Chinese production had almost replaced lost Ukrainian production. New supply side and demand side factors are emerging. On the supply-side, energy issues in Europe are limiting the global production of aluminum. Global demand is lower because of higher than anticipated U.S. interest rate increases. Futures prices in aluminum, which started rising dramatically as the pandemic began appear to have peaked before the onset of U.S. interest rate increases. The future price path is lower but the magnitude of the decline would depend on interest rate expectations and their impact on demand. There is further downside risk if the U.S. keeps interest rates higher for longer.

Automotive Parts: Supply chain issues have disrupted the availability of new cars. In particular, the lack of microchips lingers. As such, people have kept their used vehicles longer, increasing the demand for parts when raw materials prices have gone up. In addition, rising interest rates, with higher costs for new cars, also favour used vehicle demand and higher prices for them in 2022. The near-term outlook is that prices would decline in 2023 as the prices for raw materials and energy costs decelerate and flow through to buyers of vehicle parts.

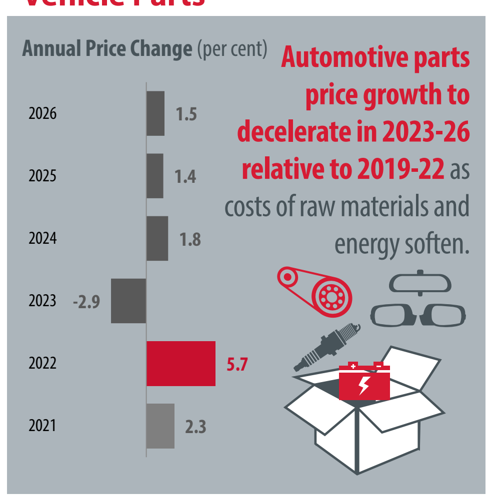
Iron and Steel



Aluminum



Vehicle Parts



Forecast

Textbox 1: Impact of High Inflation in Calgary and Alberta and the Effort to Control It

The scourge of COVID-19 is still with us, but as we learn to adapt to the new endemic reality, more people are venturing out to vacation, recreation, and work. If you add to that a major war, it's a perfect storm for inflation.

There are two types of inflation. Prices tend to rise when demand increases or supply decreases. We call these cases demand-pull and cost-push, respectively. When people demand more, like for travel, because they haven't been able to go on a vacation for years due to a pandemic, prices for things like hotels, gasoline and car rentals tend to go up. When something impacts supply, like a shortage of workers due to illness or transportation interruptions caused by war, prices for available products tend to go up. In today's world, we are experiencing both types of inflation. The combined impact is causing some of the steepest price spikes in a generation.

But it doesn't happen all at once. There are delayed reactions as price increases work their way through supply chains. When the price of a commodity goes up and manufacturers need more, then the price of their finished products goes up too. When those products are incorporated into houses, house prices go up. Some manufacturers hedge markets, while others have large inventories. Wholesale shipping of products to markets takes time, so it can take months to years for price changes to hit consumers' wallets.

Sometimes, even when prices in other markets go up, there isn't enough demand to absorb price increases in stagnant markets. Price pressures can build there for years before they can be passed on. Some prices, particularly the price of houses and labour in Calgary, have been relatively stationary for several years.

From the start of 2014 until the beginning of 2021, Calgary single-family house prices hovered around $550,000. House prices in Calgary look to have peaked in early 2022. Indications are that they will stay above $620,000 for the next while. Over two years, it's dramatic inflation. However, looking back to 2013 through to 2021, house price increases in Calgary only average 1.4 per cent per year. That's less than the overall inflation over the same period. Indeed, to catch up with inflation at 7.2 per cent in Calgary for 2022, house prices in Calgary would ordinarily be expected to rise to about $650,000.

From 2003 to 2015, average salaries and wages per Alberta employee increased by 4.8 per cent per year. However, from 2015 to 2021 it declined (by -0.7 per cent per year). Alberta labour markets should experience significant increases in the next few years to catch up with overall inflation. The population in Alberta and Calgary has been increasing while the baby boomer generation has begun exiting the workforce. They have not been replaced by as many people in traditional working age groups. Historically, Alberta had about 73 per cent of the total population in the labour force. The share has been falling since 2013. The pandemic also accelerated the decline by advancing many retirements. Now only about 69 per cent of Alberta's population is in the labour force, while the demand for goods and services has increased dramatically. This will put dramatic upward pressure on wages, starting in traditionally low-earning jobs and higher education jobs, with rising wages eventually converging into middle-income jobs.

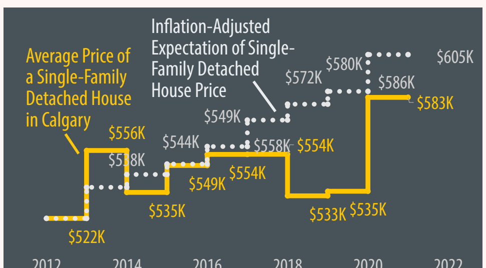
The Bank of Canada is trying to stop this heated situation from becoming a self-reinforcing vicious circle spinning faster and faster. When inflation gets too high, one price increase causes more price increases that turn around and drive the original price to increase. Eventually, things can end badly for everyone. Unfortunately, the primary tool the Bank of Canada has is interest rates and they are only effective against demand-pull inflation by encouraging ordinary Canadians to save rather than spend. Increasing interest rates does not work against cost-push inflation. Also, periods of high interest rates tend to be difficult for consumers. For example, prices of imported goods continue to rise and high mortgage costs make housing less affordable for more people.

Recent Surge in Inflation

Consumer price inflation has been very high in Calgary. It should reach an annual rate of 7.2 per cent in 2022. That means that **the overall price of goods and services in the typical consumer's basket would be 24.3 per cent higher** than they were in 2013.

Source: Statistics Canada

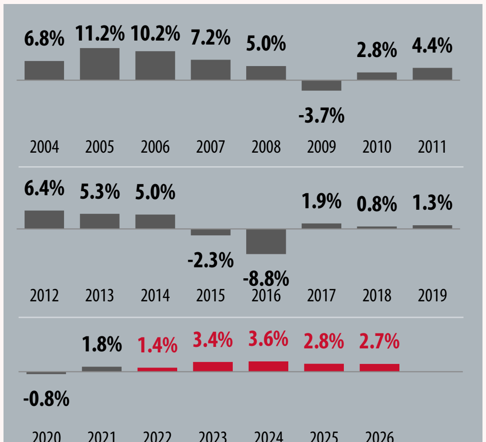
Single-Family Detached House Price Trends



Sources: Calgary Real Estate Board (House Prices), Statistics Canada

Using 2013 as a base year, the **appreciation of single-family detached houses in Calgary has not kept up with the pace of inflation**. By all indications, 2021 and 2022 are catch up years.

Salaries and Wages per Calgary Employee



Sources: Conference Board of Canada

Assumptions

Economic Conditions in Alberta

Alberta Economic Growth

Alberta is one of the few provinces likely to stay relatively insulated from current global economic challenges. Alberta's real GDP should grow by 5.3 per cent in 2022, driven mainly by export growth. Alberta's GDP should slow down to 3.4 per cent in 2023 as commodity prices stabilize with the expansion of production capacity in North America. Real GDP growth should average 2.1 per cent between 2024 and 2027.

Most private sector forecasters have indicated that the oil and gas industry will propel the Saskatchewan and Alberta economies through 2024. For example, the Conference Board of Canada's August 2022 forecast ranks 2023 real GDP growth across Canadian provinces as follows:

- Saskatchewan *(4.1 per cent)*
- Alberta *(3.5 per cent)*
- Newfoundland and Labrador *(2.9 per cent)*
- Manitoba *(2.9 per cent)*
- British Columbia *(1.9 per cent)*
- Prince Edward Island *(1.7 per cent)*
- Ontario *(1.7 per cent)*
- Quebec *(1.2 per cent)*
- Nova Scotia *(1.5 per cent)*
- New Brunswick *(1.3 per cent)*

Soaring energy prices should translate into more significant surpluses for the Government of Alberta. The 2021-2022 fiscal year, which ended March 31, saw a $3.9 billion surplus due to the inflow of resource revenue in 2022 Q1. Resource revenues hit $16.2 billion for the fiscal year, $13.3 billion above the 2021-2022 estimates. If energy prices remain elevated for 2022 and 2023, this will likely set up the Province for even more significant surpluses for the 2022-2023 and 2023-2024 fiscal years.

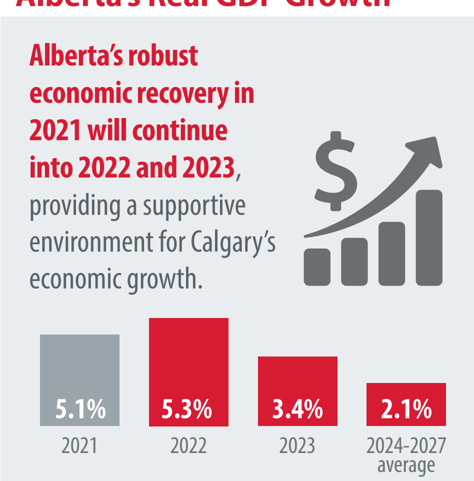
Population Growth and the Labour Market

Alberta's labour market tightened significantly in the summer of 2022. Alberta's low unemployment rate will draw migration, increasing Alberta's labour force. As a result, Alberta's population growth is projected to accelerate from 0.5 per cent (2021) to 1.7 per cent (2022) and further to 2.0 per cent (2023). In line with a slightly slower pace of economic growth for the remainder of the forecast period, population growth will decrease to an average of 1.6 per cent between 2024 and 2027.

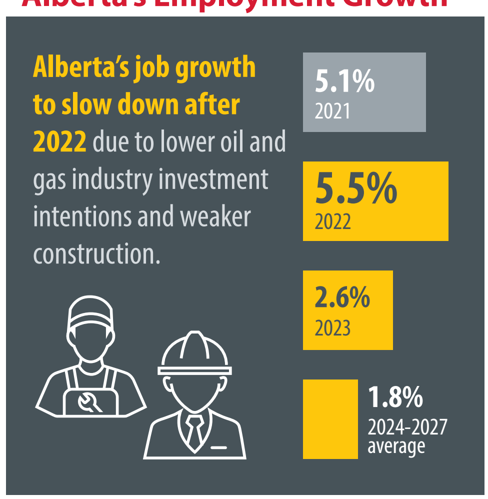
With labour market tightness in the first half of 2022, businesses and employers face issues filling job vacancies to meet demand. In early 2022, three industries – Accommodation and Food Services, Health Care and Social Assistance, and Construction – accounted for approximately 40 per cent of total job vacancies. The near-term outlook is for job vacancies to remain persistent, mainly within the services sector.

The Alberta labour force grew by 2.2 per cent, but there was a 5.1 per cent employment growth from August 2021 to August 2022.

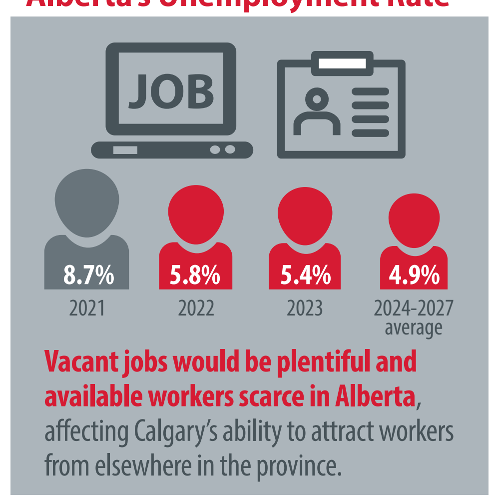
Alberta's Real GDP Growth



Alberta's Employment Growth



Alberta's Unemployment Rate



Alberta's jobs growth rate for the initial eight months of 2022 is higher than most provinces and the 3.1 per cent national average. The exception is Prince Edward Island, with higher job growth. However, Alberta's job growth should slow from 5.5 per cent in 2022 to 2.6 per cent in 2023 due to lower oil and gas industry investment intentions and weakness in the construction industry. Due to strong near-term job growth, the unemployment rate would decline from 5.8 per cent in 2022 to 4.5 per cent in 2027.

The Growth in Residential and Non-Residential Business Investment

In 2021, the residential housing stock started making up for lost ground due to the pandemic's impact on construction activity. Low supply, and the increased price of materials, led to substantial home price appreciation. As a result, housing starts increased markedly across most regions in the province, from 24,000 units in 2020 to 31,900 units in 2021. In 2022, housing starts should set a record of about 38,600 units due to strength in the residential sector, particularly high-rise condominiums in Calgary and Edmonton. The boost to residential investment activity is a crucial contributor to economic growth.

Non-residential investments of at least $5 million tracked by the provincial government identify $79.8 billion in projects under construction and another $91.9 billion in proposed projects. A large share of proposed projects is in oil and gas ($43.4 billion). Oil and gas investments continue to be affected by external market access issues. The offset has been proposed for carbon capture and sequestration investments. Capital expenditure plans for the oil and gas sector appear poised to balance immediate export opportunities with future net-zero market opportunities. Due to trade restrictions on Russia, there would be immediate export market opportunities through Alberta's pipeline developments or alternative export markets. Notable proposed investments outside of oil and gas include $2.5 billion for the Northern Petrochemical Ammonia and Methanol Production Facility and $1.6 billion for the ITOCHU Blue Ammonia Production Facility. Construction on both facilities should occur between 2023 and 2027.

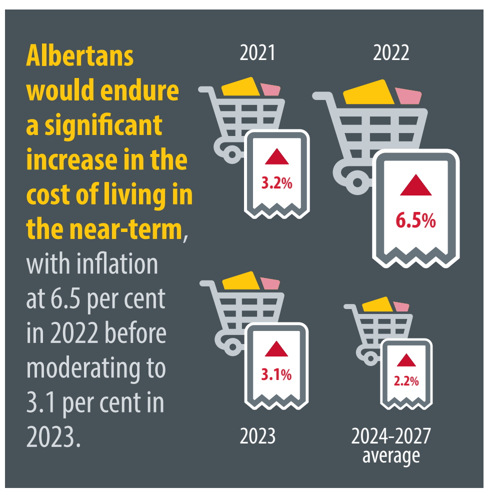
Alberta CPI Inflation and Wage Inflation

Unlike the expectation in the Spring 2022 Outlook, consumer price inflation has been even more intensive. Three factors account for persistent inflation. First, the Bank of Canada's interest rate increases needs more time to work through the economy. Second, the effect of supply chain disruptions has taken longer than expected to achieve resolution. Third, larger-than-expected economy-wide wage increases have added to the purchasing power of households sustaining high prices.

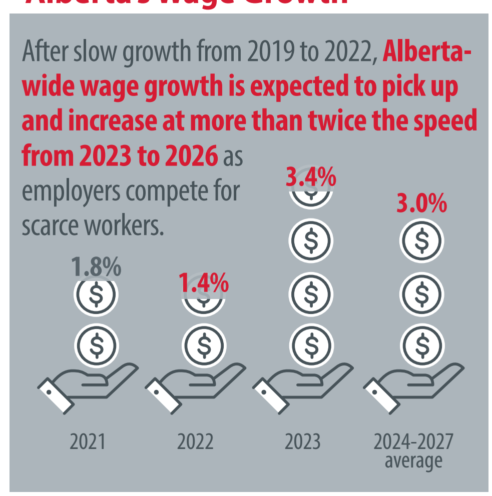
Alberta's average annual wage inflation was negative (-0.8 per cent) in 2020 before a slight increase of 1.8 per cent in 2021. Many employers appear to be catching up with wage inflation expected to increase to 3.4 per cent in 2023. Later in the forecast period, with excess capacity expected in the province, consumer price inflation should remain around 2.2 per cent between 2024 and 2027.

Alberta's Housing Starts

Alberta's Consumer Price Index



Alberta's Wage Growth



Assumptions

Textbox 2: Hydrogen Roadmap and Blending in Natural Gas Distribution Systems

On 2021 November 5, the Government of Alberta announced a Hydrogen Roadmap to "[build] a provincial hydrogen economy and [access] global markets." The Hydrogen Roadmap stated that Alberta can become a major supplier of clean hydrogen and that the adoption of clean hydrogen has the potential to reduce greenhouse gas emissions significantly by 2030.

The Hydrogen Roadmap specified markers that will be used to measure success by 2030 as Alberta's ability to:

- Integrate clean hydrogen into provincial energy systems on a large scale
- Export hydrogen to global markets
- Generate over $30 billion in new capital investment in hydrogen production and development
- Create tens of thousands of new jobs
- Reduce annual greenhouse gas (GHG) emissions by 14 megatonnes of carbon dioxide equivalent (Mt CO_2). For reference, Canada's total GHG emissions were 672 Mt CO_2 in 2020. Alberta was responsible for 256.5 Mt CO_2.

The Hydrogen Roadmap identified five important markets for the growth of clean hydrogen in Alberta:

1. Residential and commercial heating (blending hydrogen with natural gas)
2. Transportation (using hydrogen fuel cells)
3. Industrial processes (e.g., fossil fuel refining and bitumen upgrading)
4. Power generation and energy storage (e.g., hydrogen turbines and fuel cell generators)
5. Export market

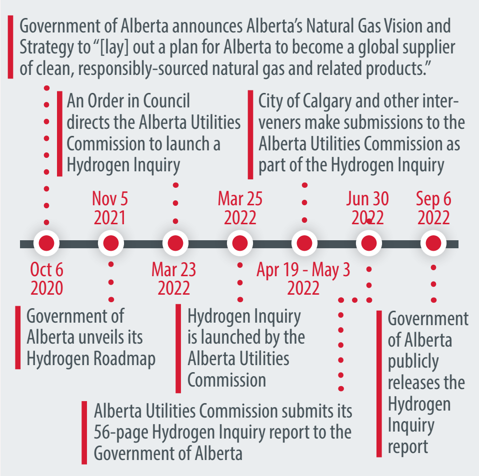
The Hydrogen Roadmap suggested that existing natural gas distribution infrastructure can accommodate the introduction of hydrogen into provincial natural gas distribution systems without significant infrastructure upgrades.

Hydrogen is expected to play an important role in a lower carbon energy future as the combustion of hydrogen emits no greenhouse gases. As such, the use of hydrogen as a fuel, including when it is blended with natural gas, has the potential to reduce greenhouse gas emissions. However, some challenges with hydrogen exist, including its lower volumetric energy density (i.e., the energy contained within a given volume), which means that additional pressure is needed in pipelines and distribution networks to deliver the same amount of energy when natural gas is blended with hydrogen.

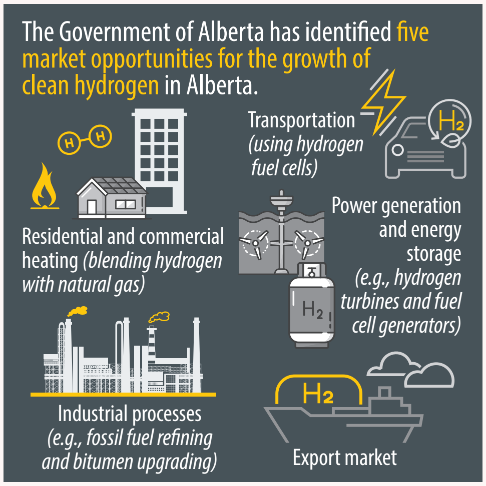
In a 2022 March 23 Order in Council (O.C. 70/2022), the Government of Alberta instructed the Alberta Utilities Commission (AUC) to launch an inquiry into matters relating to blending hydrogen into natural gas distribution systems and to submit its report to the Minister of Energy no later than 2022 June 30.

The AUC officially launched an inquiry into matters relating to blending hydrogen into natural gas distribution systems (Hydrogen Inquiry) on 2022 March 25. Through Bulletin 2022-05, the AUC stated that this Hydrogen Inquiry would explore numerous vital issues, including legislation, safety, blending standards, rate

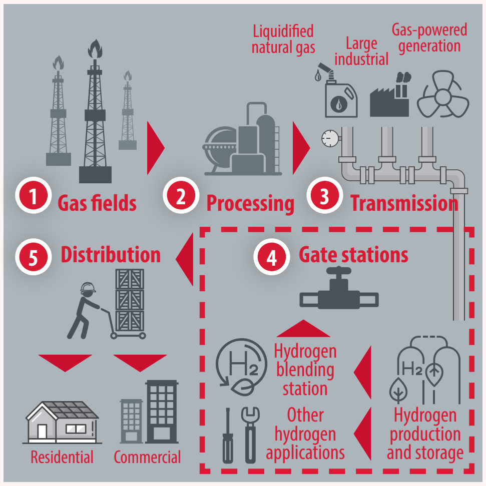
Key Milestones in Alberta



Market Opportunities for Hydrogen



Natural Gas and Hydrogen Supply Chain



Textbox 2 continued...

impacts relating to capital/commodity cost treatment, and rate impacts related to cost allocation. The AUC gathered information from interested parties. The AUC retained a consulting firm (Universal Pegasus International) to provide information on the public record about the mechanics of introducing hydrogen blending into Alberta's natural gas distribution system.

The City of Calgary made its initial Hydrogen Inquiry submission on 2022 April 19, stating that it is "supportive of the goals and objectives outlined in the Hydrogen Roadmap, particularly as it relates to emissions reductions and decarbonization." The City made follow-up submissions and replied to submissions from other parties on 2022 April 26 and 2022 May 3, respectively. These subsequent submissions emphasized issues such as legislation, rate making, and franchise fees.

On 2022 June 30, the Alberta Utilities Commission confirmed the submission of its Hydrogen Inquiry report to the Alberta Minister of Energy. The Hydrogen Inquiry report was released to the public on 2022 September 6.

In the Hydrogen Inquiry report, the Alberta Utilities Commission made several findings, including:

- An amendment of the definition of "gas" in the Gas Utilities Act to reference "up to 20 per cent hydrogen by volume" would be the most efficient way to enable hydrogen blending at the distribution level.
- Any significant changes to existing franchise rights should be avoided until the implications of hydrogen blending are better understood (i.e., status quo for franchise rights).
- Existing gas distributors (e.g., ATCO Gas and Apex Utilities) should be responsible for hydrogen procurement until a competitive hydrogen market is attainable.
- For hydrogen blending to be successful, public safety and reliability are paramount, including relevant safety and reliability standards and government-funded and delivered education initiatives.
- A "cautious" approach to blending thresholds, with a maximum blending threshold of 20 per cent by volume, but pilot projects should start at lower levels.
- The initial focus for integrating hydrogen blending should be within larger municipal systems, as blending hydrogen with natural gas for rural distribution systems is seen as more challenging and less practical.
- A regulated natural gas utility should be limited to hydrogen blending and distribution functions.
- That a slow, phased approach to hydrogen blending is reasonable because further study is required to understand the safety and integrity concerns fully, the impact of hydrogen on competitive retailers and pricing, the determination of the components of the hydrogen market that will be regulated or competitive, the impact hydrogen might have on home appliances and furnaces, and other factors.
- That it is premature to determine cost allocation/rates for hydrogen blending, but if hydrogen blending is established to benefit all Albertans (including making progress towards meeting provincial emissions reduction targets), then a "postage stamp" style rate may be appropriate.
- That natural gas rates (with the introduction of hydrogen blending) would be determined using similar/existing principles for cost recovery of other utilities. The AUC stated, "only prudently incurred distribution infrastructure costs to enable hydrogen blending should be borne by ratepayers."
- That the Government of Alberta should consider support for customers through credits, tax rebates or subsidies during the early stages of hydrogen blending (i.e., until 2030) when costs are expected to be greater than carbon savings.

Hydrogen in Alberta is still a nascent industry, and hydrogen blending is still evolving, with many technical, safety, and regulatory considerations that require further study before broad implementation can be realized. As other developments unfold, comparing the environmental benefits of hydrogen blending and the associated costs borne by utility ratepayers will be interesting.

Assumptions

Economic Conditions in Canada

The Pace of Job Creation and Canadian Economic Growth

The Canadian economy had an excellent start to the year, with quarterly real GDP growth of 0.8 per cent in 2022 Q1 and 2022 Q2. Although real GDP is now 1.7 per cent higher than the pre-pandemic peak in 2019 Q4, three areas of economic activity are lower. They are non-residential investments, exports of services, and imports of services. A decline in global travel activity impedes the latter two. Nevertheless, real GDP is forecast to grow by 3.3 per cent in 2022. It would then decelerate to an annual average of 1.5 per cent between 2023 and 2027.

Canada recovered from pandemic-related job losses by November 2021. The labour market has improved further. Canada added about 653,800 jobs in the initial eight months of 2022. That's a 3.5 per cent growth rate from 2021, well before the end of 2022. It's an essential driver of real GDP growth expectations for 2022. Persistent labour shortages have arisen in 2022, with the unemployment-to-job vacancy ratio at a historic low in 2022 Q1. Declining new hires relative to vacancies is consistent across industries and fuels expectations for more job growth in 2022.

Real GDP growth should average 1.5 per cent between 2023 and 2027 primarily because the outlook for consumer spending is positive. Conversely, the housing market and residential investment, especially in Toronto and Vancouver, are expected to cool into next year. The primary forecast risk arises from the federal government's intentions to increase spending in its upcoming budget. As a result, there is a risk that increasing government spending would work against central bank efforts to tame inflation.

Bank of Canada Interest Rate Hikes Would Increase the Prime Business Lending Rate

In 2022, Canada will experience the fastest annual consumer price inflation rate in 40 years. As a result, the Bank of Canada has had to respond aggressively. The Bank of Canada raised its overnight interest rate six times so far in 2022 by 350 basis points. There were two motivations. The first was to cool the economy and sustain the post-pandemic economic expansion. The second was an effort to normalize interest rates to secure tools to respond in the future should the risk of an economic contraction arise.

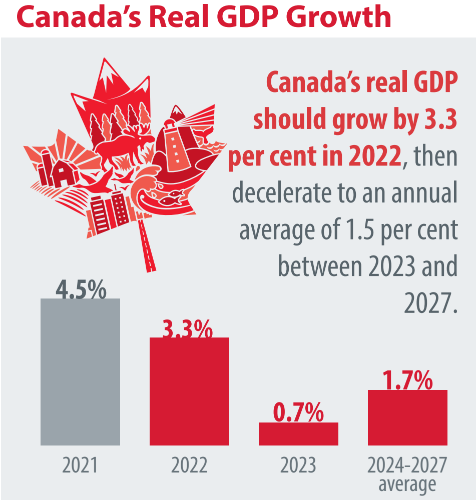
However, this does not come without repercussions for the future performance path of the Canadian economy. Household spending and business investments would cool off significantly as declining consumer confidence and real wages slow down consumption. Also, businesses would exercise caution on new investment plans in response to a possible decline in demand. The Bank of Canada appears willing to do everything in its power to ensure inflation slows down significantly. As a result, the forecast calls for a surge in the prime lending rate to 5.5 per cent by 2023 before maintaining the range between 4.4 and 4.7 per cent between 2024 and 2027.

Stable Oil Prices to Drive a Stable U.S. and Canada Exchange Rate

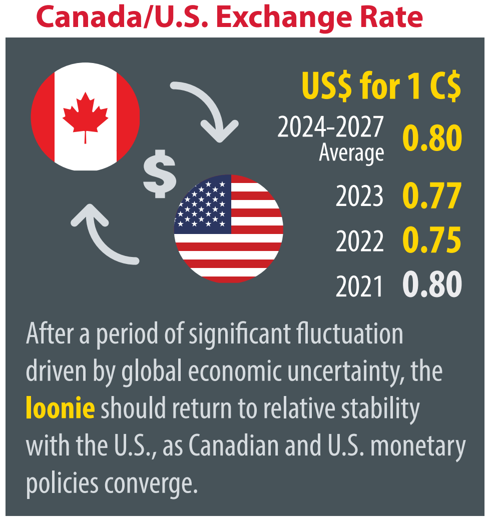
The Canadian dollar has weakened relative to the U.S. dollar in recent months – partly due to the recent decline in crude oil prices. From 2020 to mid-2022, there was a rapid appreciation of the loonie from US$0.75 to US$0.81 per CAD$. Typically, a strong Canadian dollar combined with a weak U.S. economy should decrease economic activity in Canada as the U.S. is the largest trade partner and export market for Canadian goods. However, the decline in exports has not occurred. Instead, a strong Canadian dollar has translated into higher prices for imports, which puts upward pressure on the overall consumer price inflation in Canada.

Because the expectation is for stability in WTI oil prices between 2023 and 2027, the forecast calls for a stable Canadian dollar between U.S.$0.77 and U.S.$0.81 per Canadian dollar. Exchange rate stability would support trade, as trading partners benefit from increased price certainty.

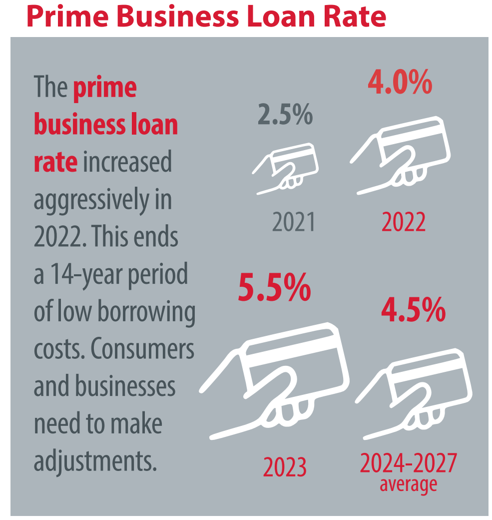
Canada's Real GDP Growth



Canada/U.S. Exchange Rate



Prime Business Loan Rate



Assumptions

Textbox 3: The Bank of Canada's Efforts to Combat High Inflation Using its Entire Toolkit

Monetary policy is a tool used in Canada at the federal level of government to preserve the value of money and keep inflation low and stable. As part of its use to control inflation, monetary policy can also stimulate the economy in the event of a downturn. The Bank of Canada implements monetary policy in Canada. The Bank of Canada is an institution of the federal government, but it retains considerable independence to fulfill its responsibilities. The current direction given to the Bank of Canada is to target an inflation rate of 2 per cent within a control range of 1 to 3 per cent. The Bank of Canada acts when inflation is outside the range across the country rather than when it is restricted to regional pockets.

The Bank of Canada uses the following three main tools to conduct monetary policy:

- Target for the overnight rate
- Quantitative easing and tightening
- Forward guidance

The overnight interest rate, or key policy interest rate, is the rate that applies to very short-term "overnight" lending and borrowing between financial institutions in Canada. While this rate only applies to large banks, it sets the basis for other interest rates, such as the prime or mortgage rates. These other rates are typically set higher than the overnight rate. Low interest rates encourage households and businesses to stimulate economic activity by borrowing and spending money. On the other hand, if the economy is relatively strong, excess demand for goods and services may outpace supply and cause price inflation. In this case, high interest rates can cool the economy and slow down inflation by encouraging saving over spending.

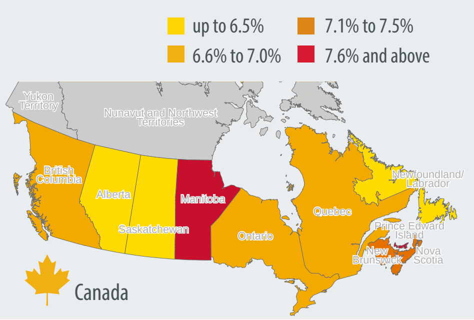
Together with adjusting the target for the overnight rate, the Bank of Canada conducts quantitative easing and tightening. Quantitative easing is a policy in which the Bank of Canada purchases government bonds (government debt obligations). This purchasing of bonds increases the total money supply in Canada and puts downward pressure on interest rates, stimulating economic activity. Quantitative tightening, the opposite of quantitative easing, is a policy in which the Bank of Canada reduces the bonds it holds and lowers the quantity of money in circulation. Quantitative tightening creates upward pressure on interest rates and helps lower inflation.

The Bank of Canada also plays a vital role in setting expectations in financial markets. Forward guidance is a tool the Bank of Canada uses to communicate its intended monetary policy plans to the public. This communication is used to influence market expectations about the future path of interest rates and reduce uncertainty for market participants. The Bank of Canada has used forward guidance this year, indicating it would do everything in its power to avoid future expectations of high inflation.

The economic impacts of the COVID-19 pandemic and subsequent recovery triggered the use of extraordinary monetary policy measures in Canada. During the initial onset of the COVID-19 pandemic in Canada in March 2020, the Bank of Canada dropped the target for the overnight interest rate to its effective minimum of 0.25 per cent and initiated quantitative easing. While these measures supported economic activity during the unprecedented challenges of the COVID-19 pandemic, a rapid economic recovery took place in 2021 and 2022. A sudden increase in demand for goods and services combined with global supply challenges led to high inflation far above the Bank of Canada's target range of 1 to 3 per cent. Thus, in 2022, the direction of monetary policy was reversed to tame inflation. So far, in 2022, the Bank of Canada has raised the target for the overnight rate by three and a half percentage points. The Bank of Canada commenced quantitative tightening in April 2022, and its Government of Canada bond holdings have declined from $436 billion in December 2021. Since the effects of monetary policy can take up to six to eight quarters to fully realize, national inflation has remained high, sitting at 6.9 per cent in September 2022.

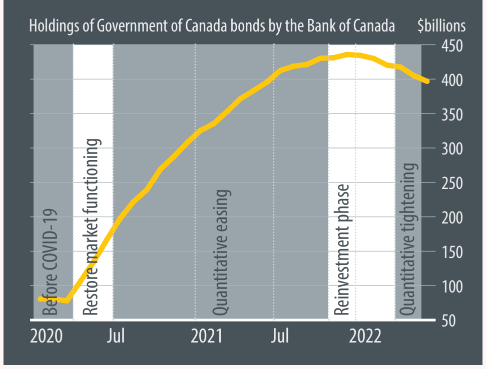
Inflation Impact across Canada

Despite the significantly high inflation levels so far in 2022, **inflation is even higher in most other provinces**. Widespread inflation has compelled the Bank of Canada's actions.

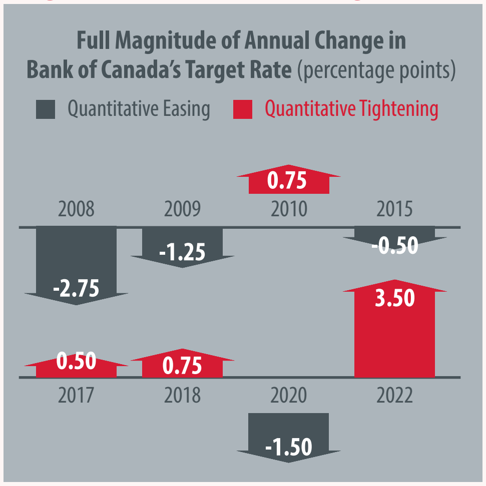


New Quantitative Tightening Phase

Quantitative tightening has replaced the easing that was in place from July 2020 to October 2021.



Significant Shift in Overnight Rate



Assumptions

The United States Economy

A Slower Path of U.S. Real GDP Growth

The 2022 U.S. real GDP growth rate forecast is 1.7 per cent. That's after two consecutive quarters of real GDP decline in 2022 Q1 and 2022 Q2. It reflects an inconsistent growth pattern over the last three years. Real GDP declined in 2020 (-3.4 per cent), real GDP surged in 2021 (5.7 per cent), and real GDP would decelerate sharply in 2022 with declines in Q1 and Q2 followed by increases in the second half of 2022.

The U.S. real GDP growth should decelerate further to 0.4 per cent in 2023. The primary driver is a slowdown in consumption and investments as individuals and firms battle significantly higher borrowing costs and shoulder higher debt burdens. However, as monetary policy loosens and energy prices begin to cool off, real GDP growth is expected to increase, averaging 1.9 per cent between 2024 and 2027.

Monetary Policy Will Lead the Way in Combating High Inflation

High consumer price inflation has become a significant concern for the U.S. Federal Reserve (the U.S. central bank). U.S. inflation was 4.7 per cent in 2021 – the highest rate since 1990. The global energy situation has been a significant driver of the record-high increases in consumer prices. Food inflation has also been high.

The U.S. Federal Reserve has tightened monetary policy significantly in 2022 to cool inflation. It has hiked rates by 300 basis points so far in 2022. These hikes signal the commitment to bringing inflation back under control. Nevertheless, the near-term outlook is for inflation to remain above the two per cent target in 2022 and 2023. In particular, consumer prices should rise by 8.1 per cent in 2022 and 3.8 per cent in 2023. That's because central bank rate hikes typically take about 18 months for the full impact to work through the economy. Moreover, the priority of inflation control comes with a cost: a slowdown in consumption and investment (both residential and non-residential) due to increased borrowing costs and debt.

In April 2022, following a Fed rate hike, the yield on U.S. 10-year Treasury notes dipped below two-year Treasury notes for two trading days (i.e., yield curve inversion). Subsequently, starting in July, the pattern reemerged and has remained sustained. It typically signals an upcoming recession within ten months to three years. A flight-to-safety likely motivated the inversion. However, the Fed would continue rate hikes despite concerns because inflation remains high.

Fiscal Policy Joins the Fight to Address High Inflation with Job Market Implications

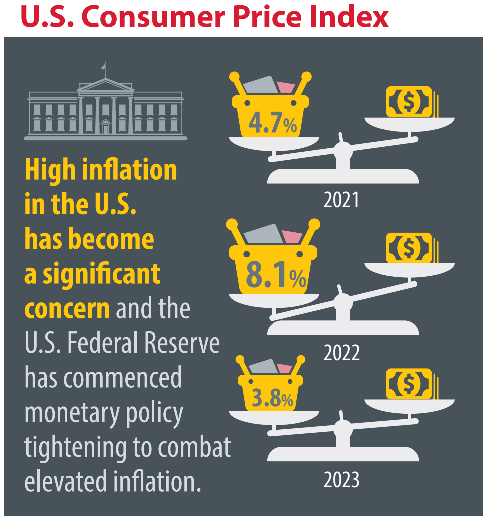
U.S. job growth has been robust over the last 18 months. With little to no change in participation rates and an increase in the number of people not in the labour force, the U.S. labour market should remain tight for the rest of 2022 and a good part of 2023. As a result, the unemployment rate should decline to 3.7 per cent in 2022.

Emerging fiscal policy efforts to fight high inflation would contribute to a change in late 2023. Specifically, the Inflation Reduction Act of 2022, signed by President Biden in August 2022, makes a commitment to lower energy bills, lower health costs, and reduce carbon emissions by roughly 40 per cent.

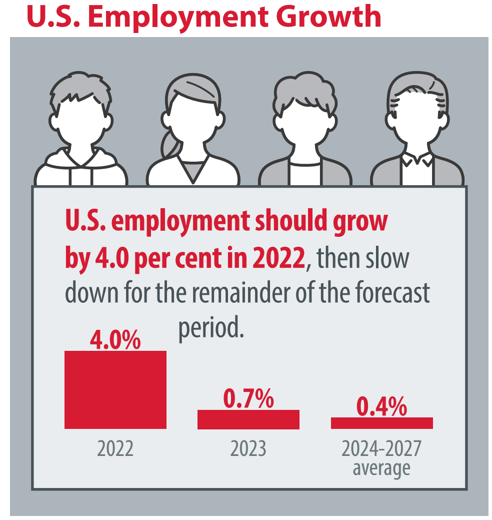
The impact of the Inflation Reduction Act would commence in the latter part of 2023. The U.S. unemployment rate should rise to 4.5 per cent in 2023 and average 4.3 per cent between 2024 and 2027. Average wages would remain elevated as employers look to attract workers and employees seek higher wages to deal with rising inflation. Employment should grow by 4.0 per cent in 2022, slow down to 0.7 per cent in 2023 and average 0.4 per cent between 2024 and 2027.

U.S. Real GDP Growth

U.S. Consumer Price Index



U.S. Employment Growth



Assumptions

The World Economy

Downward Revisions to Global Economic Performance from Spring 2022

Global economic prospects were more robust in Spring 2022. The worse-than-previously expected outlook results from the negative impacts of the risk factors identified in the spring that subsequently materialized. Those risk factors include the War in Ukraine, the monetary tightening from central banks, the fiscal withdrawal from the governments in advanced economies, and the slower growth in China due to its continuous COVID-19 lockdowns.

The Distribution of Slower Real GDP Growth across World Economies

Global real GDP growth was 6.0 per cent in 2021. The annual global real GDP growth rate should decelerate to 3.2 per cent in 2022 and 2.7 per cent in 2023. It is a downward revision from 3.6 per cent for both years that informed the Spring 2022 forecast for Calgary. The silver lining is a sustained expectation of global growth after the pandemic-driven recession of 2020 when global GDP contracted (-3.3 per cent).

Near-term, advanced economies should experience real GDP growth of 2.4 per cent (2022) before decelerating to 1.1 per cent (2023). The average pace of 1.6 per cent growth for the forecast horizon is lower than the 2.2 per cent average between 2017 and 2019. The deceleration is primarily due to an ageing population and lower global demand.

The expectation is different for developing and emerging market economies. Their near-term real GDP growth rates of 3.7 per cent (2022 and 2023) would resemble the pre-pandemic pace of growth in 2019. It is, however, below the 4.2 per cent average for the entire forecast horizon. China's Belt and Road Initiative (BRI) should be a significant driver of economic growth in the latter part of the forecast horizon.

Substantial Interest Rate Hikes in Most Major Economies to Combat High Inflation

Goods and services prices would be significantly higher due to demand-side and supply-side forces. Pent-up demand accumulated during the COVID-19 pandemic pushed demand higher than supply capacity in the advanced economies, especially for services like travel and tourism. Supply disruptions due to the ongoing Russian/Ukraine war have pushed up energy and food prices, contributing to the overall higher costs of living and production.

These forces are driving unusually high global price inflation. Global CPI inflation should reach a 40-year high of 8.8 per cent in 2022 (the highest since 1982) before decelerating to 6.5 per cent in 2023. Decisive actions in raising interest rates and quantitative tightening by major central banks (except China's and Japan's) should cool demand and bring inflation back to targeted levels beyond 2023. For the forecast horizon, the annual average inflation rate should decline to below 4 per cent between 2025 and 2027.

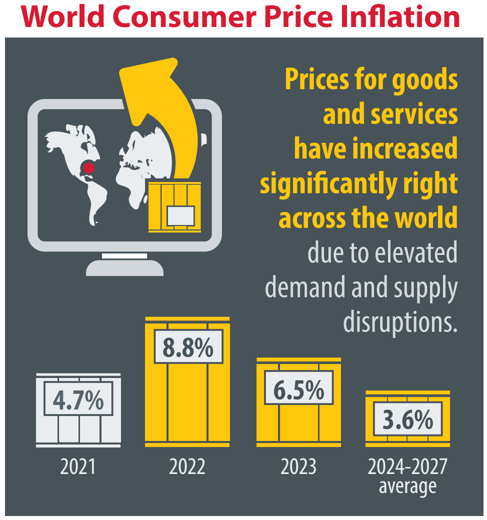
Heightened Trade Uncertainty and Effects on Global Growth

Apart from downward revisions to global GDP and upward revisions to global inflation, it's a triple whammy with downward revisions to global trade. The near-term outlook is an annual growth rate for global trade of 4.3 per cent in 2022 and 2.5 per cent in 2023. That's lower than in the spring when it was 5.0 per cent and 4.4 per cent, respectively.

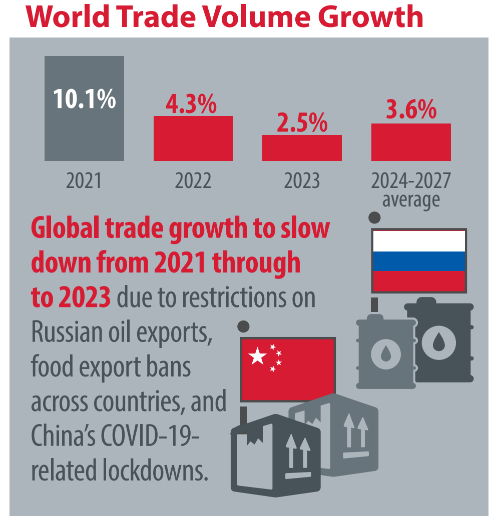
There are three significant contributing factors to the decline in global trade projections. The first is trade restrictions on Russian oil exports to Western countries since the War in Ukraine. In retaliation, Russia has cut natural gas supplies to Europe. The second is recent food export bans by many countries due to concerns about local food shortages. The third is China's COVID-19-related lockdowns that have brought more supply disruptions.

World Real GDP Growth

World Consumer Price Inflation



World Trade Volume Growth



Forecast Tables

Table 1 - Selected Economic Indicators

Rest of the World, United States, Canada, Alberta, Calgary Economic Region (CER) & Calgary Census Metropolitan Area (CMA)

FORECAST COMPLETED: October 2022						BASE FORECAST					
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ASSUMPTIONS											
World											
Real Gross Domestic Product Growth (%)†	3.8	3.6	2.8	-3.0	6.0	3.2	2.7	3.2	3.4	3.3	3.2
The United States											
Real Gross Domestic Product Growth (%)	2.3	2.9	2.3	-3.4	5.7	1.7	0.4	1.8	1.9	1.9	1.8
Canada											
Real Gross Domestic Product Growth (%)	3.0	2.8	1.9	-5.2	4.5	3.3	0.7	1.5	1.8	1.7	1.7
Prime Business Loan Rate (%)	2.9	3.6	4.0	2.7	2.5	4.0	5.5	4.7	4.4	4.4	4.4
Exchange Rate (U.S.$ for 1C$)	0.77	0.77	0.75	0.75	0.80	0.75	0.77	0.78	0.80	0.81	0.81
Alberta											
Real Gross Domestic Product Growth (%)	4.3	2.0	-0.1	-8.0	5.1	5.3	3.4	2.3	2.3	1.8	1.9
Total Employment Growth (%)	1.1	1.9	0.7	-6.6	5.1	5.5	2.6	1.9	1.8	1.8	1.8
Unemployment Rate (%)	7.9	6.7	7.0	11.4	8.7	5.8	5.4	5.2	5.0	4.7	4.5
Housing Starts ('000 Units)††	29.5	26.1	27.3	24.0	31.9	38.6	37.5	33.5	33.7	32.8	33.0
Inflation Rate - CPI (%)	1.6	2.4	1.8	1.1	3.2	6.5	3.1	2.1	2.1	2.2	2.3
Crude Oil Price - WTI (US$/bbl)*	50.8	65.2	57.0	39.2	68.1	99.1	87.5	81.2	77.1	78.4	80.0
Western Canadian Select - WCS (US$/bbl)*	38.2	38.6	43.4	27.6	55.0	83.2	72.2	68.0	66.3	67.9	69.3
Alberta Natural Gas Price - AECO/NIT ($/GJ)	2.3	1.5	1.6	2.1	3.5	5.3	4.6	4.1	3.8	3.9	4.0
Industrial Product Price Index (%)	3.1	3.9	-0.1	-0.4	13.9	11.9	-4.8	1.0	1.3	1.3	1.4
Raw Materials Price Index (%)	11.0	9.2	-2.5	-8.2	32.4	25.7	-5.9	-0.7	-0.1	0.0	0.9
Alberta Average Wage Rate Increase for All Industries (%)**	1.9	0.8	1.3	-0.8	1.8	1.4	3.4	3.6	2.8	2.7	2.7
FORECAST											
Calgary Economic Region (CER)											
Real Gross Domestic Product Growth (%)✧	4.4	0.2	2.1	-6.4	3.3	5.2	3.4	2.6	2.7	2.2	2.2
Total Employment ('000 people)	851.2	856.9	881.0	834.0	861.8	927.8	947.1	965.7	987.8	1,008.4	1,029.6
Total Employment Growth (%)	2.7	0.7	2.8	-5.3	3.3	7.7	2.1	2.0	2.3	2.1	2.1
Unemployment Rate (%)	8.5	7.6	7.2	11.7	9.1	6.0	5.8	5.6	5.3	5.1	4.9
Calgary Census Metropolitan Area (CMA)											
Housing Starts ('000 units) ✧✧	11.5	11.0	11.9	9.2	15.0	16.7	13.1	12.8	13.3	13.2	13.2
Inflation Rate - CPI (%)	1.6	2.4	1.4	1.1	3.2	7.2	3.1	2.1	2.1	2.2	2.4
Non-Residential Building Construction Inflation (%)	1.6	2.1	2.0	0.5	4.0	10.2	9.5	1.1	-0.4	-2.6	2.2

Numbers may not add up due to rounding.

Sources for historical data: † International Monetary Fund (IMP) †† Statistics Canada * Bloomberg
** Alberta, Wages & Salaries Per Employee from Conference Board of Canada ✧ Corporate Economics ✧✧ Canada Mortgage and Housing Corporation (CMHC)

Forecast Tables

Table 2 - Selected Indicators for City of Calgary

City of Calgary

						BASE FORECAST					
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
DEMOGRAPHY (FORECAST COMPLETED: April 2022)											
Total Population ('000 people)	1,246.3	1,267.3	1,285.7	1,306.4	1,321.3	1,343.5	1,366.2	1,388.9	1,409.7	1,431.5	1,454.4
Total Population Growth (%)	0.9	1.7	1.4	1.6	1.1	1.7	1.7	1.7	1.5	1.5	1.6
Net Migration ('000 people)	1.1	11.7	9.6	12.3	6.1	13.7	14.1	14.1	12.3	13.4	14.7
Household Formation ('000 units)	7.5	11.6	6.3	7.7	5.6	8.5	8.8	8.8	8.1	8.5	9.0
REAL ESTATE (FORECAST COMPLETED: October 2022)											
Residential Market											
Housing Starts ('000 units)*	9.5	9.4	10.6	7.9	12.7	14.5	10.1	10.3	10.8	10.7	10.7
Average Residential MLS Sale Price Growth (%)**	0.5	-1.1	-3.9	-0.6	7.9	3.7	-0.6	1.8	3.2	2.8	2.8
Benchmark House Price Growth (%)**	-0.2	-0.1	-3.8	-0.8	13.0	10.8	-3.0	0.3	3.0	3.0	2.8
Total Building Permits ($billions)	4.6	4.6	5.2	3.4	5.7	6.2	5.2	5.3	5.6	5.7	5.9

Numbers may not add up due to rounding.

Source for historical data: * Canada Mortgage and Housing Corporation (CMHC) ** Calgary Real Estate Board (CREB)

Table 3 - Selected Commodity Prices

City of Calgary

FORECAST COMPLETED: October 2022						BASE FORECAST					
Unit: per cent	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CONSTRUCTION COMMODITIES											
Iron and Steel Products	4.2	8.7	4.3	-0.8	27.6	19.4	-28.2	-13.1	-1.0	2.1	1.8
Aluminum Products	7.0	11.4	0.8	-9.3	29.6	35.5	-38.2	-25.2	10.1	3.5	5.1
Wood	7.9	7.6	-3.0	24.3	53.0	9.8	-15.4	-10.3	0.7	-0.1	-2.3
Asphalt*	8.7	26.8	6.3	-9.5	4.5	43.8	-5.3	-1.3	0.3	6.1	4.1
OPERATIONAL COMMODITIES											
Rubber	20.1	-20.3	6.7	0.5	15.3	1.6	2.7	-5.8	-3.7	1.6	2.9
Diesel Oil	17.3	19.4	-7.7	-15.4	25.7	33.3	-11.6	-5.6	-3.0	3.3	4.2
Vehicle Parts	1.3	2.7	2.0	1.1	2.3	5.7	-2.9	1.8	1.4	1.5	-0.4

Numbers may not add up due to rounding.

* Based on Ontario Ministry of Transportation Asphalt Price Index

Table 4 - City of Calgary Population Projection

City of Calgary *(thousands of people)*

FORECAST COMPLETED: April 2022					Estimate		FORECAST				
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Population *(as of April)*	1,246.3	1,267.3	1,285.7	1,306.4	1,321.3	1,343.5	1,366.2	1,388.9	1,409.7	1,431.5	1,454.4
Total Population Growth Rate (%) *(April-March)*	0.9	1.7	1.4	1.6	1.1	1.7	1.7	1.7	1.5	1.5	1.6
Total Net Migration *(April-March)*	1.1	11.7	9.6	12.3	6.1	13.7	14.1	14.1	12.3	13.4	14.7
Total Births *(April-March)*	16.3	15.9	15.3	15.6	15.8	15.8	16.1	16.3	16.4	16.5	16.6
Total Deaths *(April-March)*	6.2	6.6	6.5	7.2	7.1	7.3	7.5	7.7	7.9	8.1	8.3
Total Natural Increase *(April-March)*	10.1	9.3	8.8	8.4	8.7	8.6	8.6	8.6	8.6	8.4	8.3
Total Households *(as of April)*	471.2	482.7	489.1	496.7	502.4	510.8	519.7	528.5	536.6	545.1	554.1
Total Household Formation *(April-March)*	7.5	11.6	6.3	7.7	5.6	8.5	8.8	8.8	8.1	8.5	9.0
Population by Cohort	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0-4	78.7	79.2	79.7	79.6	79.0	78.8	79.3	79.5	80.0	80.4	81.1
5-9	79.1	80.2	80.0	79.3	81.5	80.9	79.8	79.5	79.1	78.7	78.6
10-14	69.2	71.9	74.6	77.0	77.8	79.2	80.6	81.7	82.1	82.2	81.7
15-19	68.7	69.6	70.9	70.8	72.6	73.7	74.9	75.8	77.8	80.0	81.4
20-24	77.5	77.0	78.2	78.9	79.7	80.2	81.1	82.1	82.1	81.9	83.2
25-29	102.5	100.1	98.1	97.4	97.3	98.1	97.6	98.0	98.0	99.0	100.0
30-34	114.3	114.0	113.0	113.8	114.3	115.1	116.6	116.2	115.4	115.6	116.6
35-39	104.6	107.8	110.8	115.8	114.8	119.0	122.2	125.6	128.0	128.7	129.6
40-44	95.3	96.6	98.2	101.8	102.8	106.7	111.2	116.1	120.2	125.1	129.4
45-49	87.7	90.1	91.3	93.2	93.9	96.0	98.8	100.8	103.7	107.1	111.1
50-54	86.4	85.2	83.9	84.0	86.4	87.2	88.0	90.6	93.1	95.1	97.2
55-59	81.6	82.6	83.2	83.1	83.9	83.2	82.4	81.4	81.6	82.1	82.8
60-64	65.0	69.1	72.1	73.9	74.9	75.9	77.0	77.6	77.1	76.5	75.7
65-69	48.2	50.2	52.5	55.2	56.4	59.6	62.0	64.6	67.2	69.3	70.3
70-74	31.4	34.7	37.8	40.1	41.2	42.7	45.2	48.1	49.7	51.5	54.4
75-79	22.2	23.5	24.9	25.8	26.8	28.4	30.1	30.9	33.4	35.7	37.1
80-84	16.9	17.4	17.6	17.7	18.4	19.0	19.2	19.9	20.5	21.4	22.6
85-89	11.1	11.6	11.8	11.8	12.2	12.3	12.2	12.4	12.7	12.6	13.0
90-99	5.9	6.3	6.8	7.0	7.1	7.2	7.4	7.6	7.8	8.1	8.2
100+	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Total	**1,246.3**	**1,267.3**	**1,285.7**	**1,306.4**	**1,321.3**	**1,343.5**	**1,366.2**	**1,388.9**	**1,409.7**	**1,431.5**	**1,454.4**
Youth (12-18)	81.5	83.4	85.1	86.7	89.1	90.6	93.1	95.5	97.0	98.1	99.2
Primary School Age 6-17	173.3	177.7	180.7	182.9	186.2	188.3	190.5	192.0	192.8	193.5	194.3
Working Age 15-65	883.4	892.2	899.7	912.7	920.5	935.1	949.8	964.2	976.9	991.1	1,007.0
Seniors 65+	136.0	143.9	151.6	157.9	162.5	169.5	176.6	184.0	191.6	199.0	206.0
Super Seniors 85+	17.2	18.1	18.9	19.1	19.6	19.9	20.1	20.4	20.9	21.1	21.6
Female Super Seniors 85+	11.0	11.5	12.0	12.1	12.5	12.6	12.8	13.0	13.2	13.4	13.8
Average Age	**37.0**	**37.2**	**37.5**	**37.6**	**37.7**	**37.9**	**38.1**	**38.3**	**38.5**	**38.7**	**38.8**

Numbers may not add up due to rounding.

Table 5 - Calgary Census Metropolitan Area (CMA) Population Projection

Calgary Metropolitan Area (CMA) *(thousands of people)*

FORECAST COMPLETED: April 2022						FORECAST					
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Population *(as of July)*	1,458.3	1,483.5	1,514.5	1,544.9	1,559.4	1,591.4	1,619.4	1,647.3	1,673.7	1,700.6	1,728.2
Total Population Growth Rate (%) *(July-June)*	1.4	1.7	2.1	2.0	0.9	2.1	1.8	1.7	1.6	1.6	1.6
Total Net Migration *(July-June)*	11.6	17.3	20.9	21.2	6.9	19.9	20.1	20.1	18.9	19.6	20.5
Net Migration 18-24 *(July-June)*	3.6	4.5	5.4	5.0	2.4	4.8	4.9	4.9	4.6	4.8	5.0
Net Migration 28-40 *(July-June)*	2.5	4.8	5.6	6.7	2.8	5.3	5.3	5.3	5.0	5.2	5.4
Total Births *(July-June)*	18.3	18.0	17.4	17.3	17.8	17.6	17.7	17.7	17.8	17.8	17.9
Total Deaths *(July-June)*	6.9	7.3	7.3	7.5	8.3	8.6	9.7	9.9	10.2	10.5	10.8
Total Natural Increase *(July-June)*	11.4	10.7	10.1	9.7	9.5	9.1	8.0	7.8	7.5	7.3	7.1

Population by Cohort	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0-4	91.4	91.2	90.9	90.0	86.9	87.3	87.8	88.8	90.0	91.7	92.0
5-9	93.4	93.7	93.9	94.2	94.6	95.5	96.2	96.3	95.6	94.0	94.4
10-14	84.2	87.6	90.9	94.1	95.8	97.8	98.9	99.6	100.2	101.7	102.7
15-19	82.2	83.3	84.9	86.6	87.1	90.9	95.3	99.3	103.1	106.2	108.3
20-24	91.5	91.7	93.5	94.8	94.4	95.3	96.5	98.4	100.2	102.5	106.4
25-29	115.4	114.0	112.4	110.5	107.6	107.7	108.4	109.8	111.3	112.8	113.8
30-34	129.6	129.2	129.7	131.2	129.6	128.3	127.3	124.7	121.9	120.6	120.8
35-39	122.7	126.9	131.2	134.8	136.7	137.9	137.9	138.1	138.5	137.9	136.7
40-44	110.7	113.0	116.4	120.4	124.0	128.2	132.6	136.8	139.8	142.2	143.4
45-49	103.3	105.3	107.2	109.4	110.6	112.6	115.0	118.1	121.5	125.2	129.4
50-54	97.5	96.4	96.0	96.8	99.1	101.6	103.9	105.6	107.6	109.0	111.0
55-59	94.9	96.0	97.0	97.3	96.0	94.8	93.8	93.3	93.9	96.4	98.9
60-64	79.2	83.0	86.7	89.4	91.0	92.3	93.6	94.4	94.5	93.5	92.4
65-69	57.6	60.5	64.8	69.0	73.2	77.8	81.5	84.7	87.3	89.2	90.4
70-74	39.7	43.5	47.1	51.0	54.2	56.4	59.1	62.9	66.7	71.0	75.3
75-79	26.2	28.0	30.0	32.0	34.1	37.7	41.2	44.2	47.7	50.7	52.4
80-84	19.1	19.7	20.4	21.1	22.0	23.1	24.4	25.9	27.3	29.1	32.3
85-89	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.9	15.2	15.8	16.6
90+	7.2	7.6	8.2	8.6	8.8	12.2	11.8	11.4	11.4	11.4	11.3
Total	**1,458.3**	**1,483.5**	**1,514.5**	**1,544.9**	**1,559.4**	**1,591.4**	**1,619.4**	**1,647.3**	**1,673.7**	**1,700.6**	**1,728.2**

Average Age	**37.0**	**37.3**	**37.6**	**37.8**	**38.2**	**38.5**	**38.6**	**38.8**	**39.0**	**39.2**	**39.4**

Numbers may not add up due to rounding.

Table 6 - Calgary Economic Region (CER) Population Projection

Calgary Economic Region (CER) *(thousands of people)*

FORECAST COMPLETED: April 2022						FORECAST					
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Population *(as of July)*	1,567.8	1,593.2	1,624.9	1,655.9	1,670.5	1,700.3	1,729.4	1,758.6	1,786.4	1,815.0	1,844.6
Total Population Growth Rate (%) *(July-June)*	1.3	1.6	2.0	1.9	0.9	1.8	1.7	1.7	1.6	1.6	1.6
Total Net Migration *(July-June)*	9.2	14.7	21.5	21.6	7.1	21.3	21.1	21.4	20.4	21.6	23.0
Total Births *(July-June)*	19.1	18.8	18.3	17.9	17.2	18.9	19.0	19.0	19.0	19.1	19.2
Total Deaths *(July-June)*	7.6	8.1	8.0	8.5	11.5	10.6	10.9	11.3	11.7	12.1	12.6
Total Natural Increase *(July-June)*	11.5	10.6	10.3	9.4	5.7	8.3	8.0	7.7	7.3	6.9	6.6

Population by Cohort	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0-4	97.4	97.0	96.6	95.7	92.3	92.6	93.3	94.5	96.0	98.2	98.6
5-9	100.8	100.9	100.9	101.2	101.6	102.1	102.3	102.0	100.8	98.5	99.0
10-14	91.8	95.4	98.9	102.2	103.9	105.3	105.7	105.8	105.9	107.0	107.6
15-19	89.2	90.4	92.2	93.9	94.6	98.3	102.3	105.7	109.1	111.6	113.2
20-24	97.3	97.4	99.3	100.7	100.2	101.4	103.0	105.0	106.8	109.2	113.2
25-29	120.8	119.4	118.0	116.1	113.1	113.4	114.2	115.9	117.8	119.6	121.1
30-34	135.8	135.2	135.6	137.1	135.5	135.2	134.9	133.3	130.9	130.1	130.6
35-39	129.8	133.9	138.1	141.4	143.1	144.4	144.6	145.1	146.2	146.3	146.1
40-44	118.0	120.3	123.5	127.4	131.0	135.3	139.8	144.1	147.2	149.7	151.1
45-49	111.0	113.0	114.7	116.7	117.8	119.8	122.4	125.7	129.5	133.4	137.8
50-54	105.4	104.1	103.5	104.4	106.7	109.4	111.6	113.3	115.1	116.5	118.5
55-59	103.3	104.4	105.4	105.5	103.9	102.6	101.6	101.1	101.9	104.4	107.1
60-64	86.8	90.8	94.6	97.4	99.0	100.3	101.6	102.6	102.5	101.5	100.2
65-69	63.8	66.9	71.5	76.0	80.4	85.3	89.2	92.5	95.2	97.2	98.5
70-74	44.4	48.6	52.6	56.7	60.2	62.4	65.2	69.1	73.2	77.6	82.1
75-79	29.2	31.2	33.5	35.7	38.0	41.8	45.5	48.7	52.1	55.4	57.3
80-84	21.1	21.7	22.5	23.4	24.4	25.3	26.7	28.3	29.8	31.6	34.8
85-89	13.9	14.2	14.6	15.0	15.2	15.4	15.6	15.9	16.2	16.7	17.4
90+	7.9	8.3	9.0	9.4	9.6	9.8	10.0	10.1	10.3	10.5	10.6
Total	**1,567.8**	**1,593.2**	**1,624.9**	**1,655.9**	**1,670.5**	**1,700.3**	**1,729.4**	**1,758.6**	**1,786.4**	**1,815.0**	**1,844.6**

Average Age	**37.2**	**37.5**	**37.8**	**38.0**	**38.4**	**38.6**	**38.8**	**39.0**	**39.2**	**39.4**	**39.6**

Numbers may not add up due to rounding.

Glossary

Advanced economies
Since October 2021 the IMF has recognized 40 developed countries as advanced economies: Andorra, Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Den¬mark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, (Republic of) Korea, Latvia, Lithuania, Luxembourg, Macao SAR, Malta, Netherlands, New Zealand, Norway, Portugal, Puerto Rico, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom and the United States.

AECO-C
Is the central natural gas spot market price for Alberta, measured in Canadian dollar per gigajoule. Joule is the international measure of energy. One gigajoule corresponds to one billion joules.

Apartment
Within the context of this report and Calgary's Civic Census, an apartment is a structure originally designed and built to contain at least three dwelling units on three or more levels. The dwelling units share outside entrances. Apartments include rental units and those that are owner-occupied.

Attached housing
A property with one floor above ground that shares at least one wall (or a part of a wall) with another home.

Baby boomer
As defined by Statistics Canada, a "baby boomer" is a person who was born between 1946 and 1965. This timeframe is characterized by a high birth rate in Canada between the end of World War II in 1945 and the emergence of the birth control pill in the early 1960s.

Bank of Canada
The Bank of Canada is the central bank of Canada tasked to provide monetary and fiscal stability to the economy.

Belt and Road Initiative (BRI)
The Belt and Road Initiative (BRI) is an ambitious global infrastructure development strategy adopted by the Chinese government in 2013 to invest in nearly 150 countries and international organizations. The goal extends beyond infrastructure to developing an expanded, interdependent market for China. It focuses on connectivity and cooperation across six main economic corridors encompassing China and: Mongolia and Russia; Eurasian countries; Central and West Asia; Pakistan; other countries of the Indian sub-continent; and Indochina.

Business Fixed Investment
Business fixed investment represents the spending by businesses to increase production capacity. It is traditionally decomposed into equipment (such as computers and machines), structures (such as plants, shopping malls, or warehouses), and intellectual property (such as software and research and development).

Calgary Economic Region (CER)
Is an Alberta economic region that covers the city of Calgary and its surrounding twenty cities, towns, villages, and Indian reserves including: Beiseker (Village), Black Diamond (Town), Carstairs (Town), Chestermere (City), Cochrane (Town), Cremona (Village), Crossfield (Town), Didsbury (Town), Eden Valley 216 (Indian reserve), Foothills No. 31 (Municipal district), High River (Town), Irricana (Town), Longview (Village), Mountain View County (Municipal district), Okotoks (Town), Olds (Town), Rocky View County (Municipal district), Sundre (Town), Tsuu T'ina Nation 145 (Sarcee 145) (Indian reserve), Turner Valley (Town).

Census metropolitan area (CMA)
Urban Census metropolitan area (CMA) is an area consisting of one or more neighbouring municipalities situated around a major urban core. A CMA must have a total population of at least 100,000 of which 50,000 or more live in the urban core.

Commodities
Commodities are tangible goods that can be bought and sold in spot or futures markets. Commodities are goods that are usually produced and/or sold by many different companies. A commodity is uniform in quality between companies that produce/sell it in the sense that we cannot tell the difference between one firm's product and another. Examples of commodities include oil, electricity, metals, cement and agricultural products, such as wheat, corn, and rice.

Consumer price index (CPI)
The Consumer Price Index (CPI) is an indicator of the consumer prices encountered by consumers. It is obtained by calculating, on a monthly basis, the cost of a fixed "basket" of goods purchased by a typical consumer during a given month. The basket contains products from various categories, including shelter, food, entertainment, fuel and transportation. Since the contents of the basket remain constant in terms of quantity and quality, the changes in the index reflect price changes. The CPI is a widely used indicator of inflation (or deflation) and indicates the changing purchasing power of money in Canada.

Detached housing
Independent structures that are typically built on land that exceeds the footprint of the building on each of its sides.

Developing and emerging market economies
This group of countries include developing economies that are low- and middle-income countries, and emerging economies that are in transition from developing economies to developed countries. Some of the largest countries in the world like China, India, Brazil and Russia are emerging economies.

Economic region
An economic region (ER) is a grouping of complete census divisions (CDs) created as a standard geographic unit for analysis of regional economic activity.

Economy
The term economy refers to the institutional structures, rules and arrangements by which people and society choose to employ scarce productive resources that have alternative uses in order to produce various goods over time and to distribute them for consumption, now and in the future, among various people and groups in society. In a free market economy like Canada's the laws of supply and demand determine what, how and where goods and services should be produced, who should consume them and when. A "strong' or "healthy" economy is usually one that is growing at a good pace.

Employment rate
The number of employed people expressed as a percentage of the working age population.

European Union
A political and economic union of 27 member states that are located primarily in Europe. The IMF expects the European Union to account for approximately 18 per cent of global GDP in 2022. Some of the largest economies that are EU member states include Germany, France, Italy, Spain, and the Netherlands.

Fiscal policy
Also called budgetary policy, the overall program for directing government spending and taxation for the purpose of keeping the actual Gross Domestic Product (GDP) close to the potential full employment GDP, but without overreaching that potential and causing inflation.

Federal Reserve
The Federal Reserve System is the central bank of the United States tasked to provide monetary and fiscal stability to the economy.

Goods-producing sector
Includes agriculture, forestry, fishing, mining, oil and gas extraction, utilities (electric, gas and power), construction and manufacturing.

Gross domestic product (GDP)
GDP is a measure of the value of all goods and services produced by the economy. Unlike Gross National Product (GNP), GDP only includes the values of goods and services earned by a region or nation within its boundaries.

Henry Hub
Henry Hub is a natural gas pipeline in Louisiana that serves as the pricing and delivery location of natural gas futures on the New York Mercantile Exchange (NYMEX).

Housing markets
Consists of two markets: new house and re-sale markets referred to as MLS (Multiple Listing Service). Each is described by different parameters and followed closely by different statistical bodies: the Planning and Building Department with The City of Calgary and Statistics Canada for new houses, and The Canadian Real Estate Association for the re-sale market.

Housing units
A general term that refers to single-family houses, townhouses, mobile homes and/or condominiums.

Housing starts
A housing start is defined as the beginning of construction work on a building, usually when the concrete has been poured for the whole of the footing around the structure, or an equivalent stage where a basement will not be part of the structure.

IMF
The International Monetary Fund (IMF) is an organization created in 1945, governed by and accountable to the 189 countries that make up its near-global membership. The IMF's primary purpose is to ensure the stability of the international monetary system—the system of exchange rates and international payments that enables countries (and their citizens) to transact with each other.

Index
An economic tool that allows for data comparison over time. An index number is used to indicate change in magnitude (cost or price) as compared with the magnitude at some specified time.

Industrial Product Price Index (IPPI)
The Industrial Product Price Index (IPPI) measures price changes for major commodities sold by manufacturers. The prices collected are for goods sold at the factory gate. As a result, the prices covered by the IPPI refer not to what a purchaser pays, but to what the producer receives.

Inflation rate
A measure of the percentage change in the Consumer Price Index for a specific period of time.

Labour force
The working age population (aged 15+) who are actively involved in the labour market, which includes those employed and unemployed people. It does not include people who are at their working age but not working or looking for work.

Glossary

MLS
The Multiple Listing Service, or MLS, is a local or regional service that compiles available real estate for sale submitted by member brokers and agents, along with detailed information that brokers and agents can access online.

Monetary policy
Refers to government measures undertaken to affect financial markets and credit conditions with the ultimate objective of influencing the overall behaviour of the economy. Monetary policy is usually the responsibility of the central banks, such as the Bank of Canada.

Multiplier effect
Refers to additional shifts in aggregate demand that result when expansionary fiscal policies (e.g. effective government spending) increases individual income and thereby increases consumer spending.

Non-Residential Construction Price Inflation
Non-residential construction price inflation measures the overall price escalation seen in the construction of non-residential buildings. This indicator includes the impact of input prices, labour costs, taxes, fluctuating profit margins and the effect of the overall economy on demand for local non-residential construction projects.

OPEC
The Organization of Petroleum Exporting Countries (OPEC) is an organization of 13 oil producing countries (Algeria, Angola, Congo, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, the United Arab Emirates, and Venezuela) that seeks to actively manage oil production in its member countries by setting production targets. OPEC member countries typically produce 40 to 50 per cent of the world's crude oil, and Saudi Arabia is OPEC's largest producer. OPEC is described by most market observers as a cartel whose actions, particularly those by Saudi Arabia, serve as a major influence on global oil production and price.

OPEC+
OPEC+ was established in 2016 amid a global economic slowdown and strong production from U.S. shale producers to stabilize oil prices by jointly cutting production among its members. OPEC+ describes the 13 members of OPEC plus 10 oil exporting non-OPEC countries (Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan, and Sudan). Russia is the largest and most influential oil producing member of OPEC+ who is not a formal member of OPEC.

Overnight Rate
The overnight interest rate is the rate for overnight (between business days) lending among major banks in Canada. It is typically the lowest of all types of interest rates and influences other interest rates. The Bank of Canada sets the target for the overnight rate as one way to conduct monetary policy. Major banks can deposit money overnight with the Bank of Canada and receive an interest rate equal to the target rate (the "deposit rate") or borrow money from the Bank of Canada at a rate one-quarter of a percentage point higher (the "bank rate").

Quantitative Tightening
A contractionary monetary policy implemented by central banks in order to reduce liquidity or reduce money supply. This is usually done by the central bank reducing its assets on the balance sheets.

Raw Materials Price Index (RMPI)
The Raw Materials Price Index (RMPI) measures price changes for raw materials purchased for further processing by manufacturers. As a purchasers' price index, prices include all charges purchasers incur to bring a commodity to the establishment gate. They include transportation charges, net taxes paid, custom duties, as well as subsidies, if applicable.

Recession
A period in which the economy experiences two consecutive quarters of gross domestic product decreases. During this temporary period there is a decline in industrial production and trade.

Soft Landing
A soft landing is the goal of a central bank when it seeks to raise interest rates just enough to stop an economy from overheating and experiencing high inflation without causing a severe downturn. It is the process of an economy shifting from growth to slow growth to potentially zero growth as it approaches but avoids a recession.

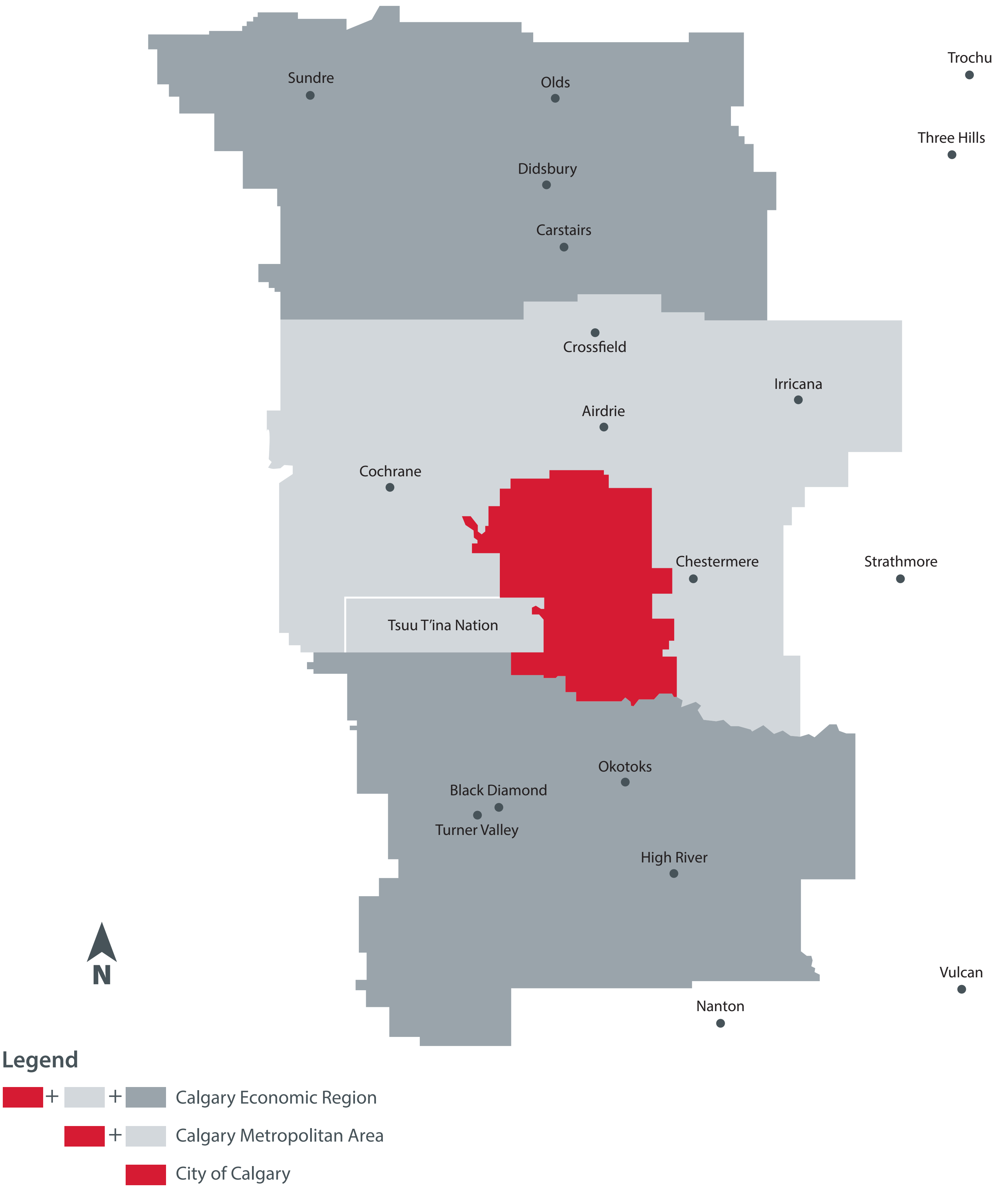
Unemployment Rate
In Canada, the unemployment rate measures unemployment and is expressed as a percentage of the total labour force, which is the total number of people who are 15 years of age and over who are either employed or unemployed.

WCS
Western Canadian Select (WCS) is the benchmark for emerging heavy, high TAN (acidic) crudes, one of many petroleum products from the Western Canadian Sedimentary Basin oil sands.

Working age population
Describes people aged 15 to 64.

WTI
West Texas Intermediate (WTI) crude oil is the underlying commodity of the New York Mercantile Exchange's oil futures contracts. Light, sweet crude oil is commonly referred to as "oil" in the Western world.

Calgary Economic Region Map



Who We Are

Corporate Economics provides services in four areas: forecasting, information provision, policy analysis and consulting. We also monitor the current economic trends which allows us to develop unique insights on how external events are impacting the local economy and the Municipal government. We are experienced at researching different economic topics and have developed reliable methods of forecasting and analysis.

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Many of our publications are available on the internet at **www.calgary.ca/economy**.

Sources:
Bank of Canada, Canada Mortgage and Housing Corporation (CMHC), Conference Board of Canada, Canadian Real Estate Association (CREA), Calgary Real Estate Board (CREB), Government of Alberta, Government of Canada, International Monetary Fund (IMF), Statistics Canada, Stokes Economics, The City of Calgary, U.S. Energy Information Administration (EIA), Federal Reserve Bank of St. Louis (FRED), World Health Organization (WHO), and others.