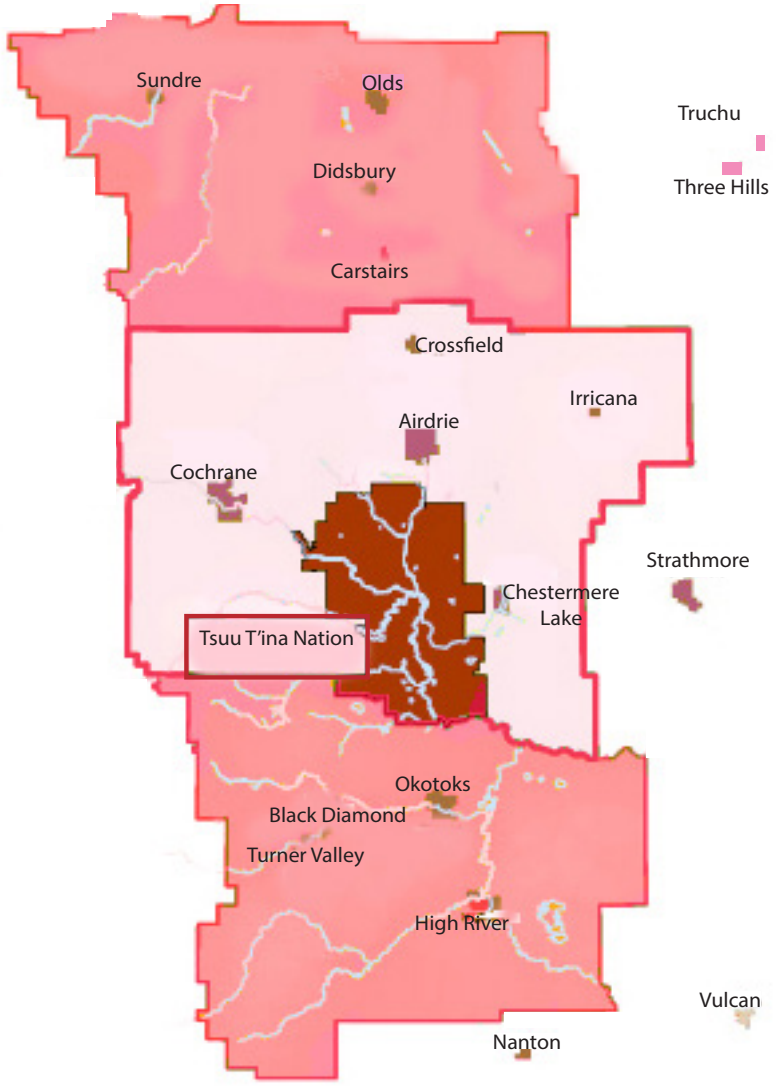
Calgary and Region Economic Outlook

2017 - 2022

Spring 2017

Table of Contents

Calgary Economic Region Map



Authors:
Patrick Walters
Clyde Pawluk
Ivy Zhang
Chukwudi Osuji
Assistant:
Jorjeta Bojanova

Introduction

Preamble

The City of Calgary monitors and tracks economic indicators to develop insights on how external events are impacting the local economy throughout the year. The results from this process are published twice annually as the Economic Outlook: once in the spring and then again in the fall. The Economic Outlook presents forecasts for a select number of economic variables.

This document provides an analysis of those factors that are considered most likely to have a significant effect on the local economy over the forecast period.

Purpose

- This publication is created to serve as a reference document to support The City of Calgary in financial and physical planning of the city. It also provides a common basis from which decisions could be made. By monitoring and reporting on the economic region and its environment, decision makers are kept abreast of the opportunities and threats that the region faces.
- This report fills an important information gap as no other publication currently provides a comprehensive analysis of the local economy. Several research institutions restrict their analyses to the Alberta economy and few analyses and forecasts are available for the urban areas within the province.
- This report attempts to answer the following questions:
  - What is the overall forecast for the rate of growth in the local economy?
  - What are the drivers of the local economy?
  - How many jobs are expected to be created?
  - What is the forecast for population growth in the city and region?
  - What is the expected inflation rate?
  - What are the implications of the forecast and how will it impact municipal finance?

Assumptions

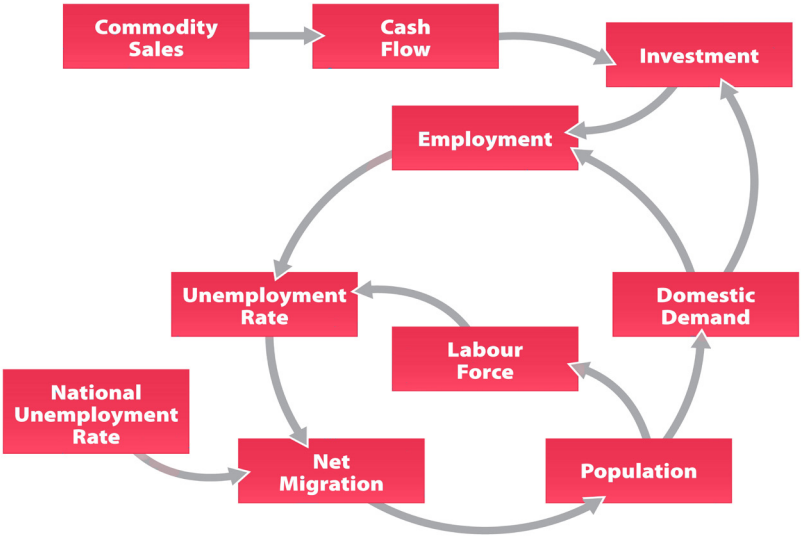
The study area for the economic forecast is the Calgary Economic Region (CER). The CER is a small open economy and is therefore affected by changes outside its borders. For example, political instability in the world's oil producing regions can cause sharp increases or decreases in oil prices, which affect Alberta's energy industry's cash flow and investment in the local economy.

The economic forecast is therefore built on assumptions regarding changes in the world outside of the CER over the forecast period. The key assumptions are as follows:

1. World economic expansion throughout the forecast period, and
2. Economic growth and job creation in the rest of Canada over the forecast period.

If one or both of these assumptions are not fulfilled then the level of economic activity that is charted in this report would not be realized.

Regional Growth Dynamics



Executive Summary

Calgary's economy peaked in 2014 with the spike in oil prices. Since then the Calgary economy has declined. The outlook calls for growth to begin this year but it will take several years before 2014 levels of economic activity return. For example, the jobs lost during the recession are not expected to fully return to Calgary before 2019. Also, the unemployment rate is not expected to return to its 2015 level of 4.9 per cent until beyond the forecast horizon.

Forecast

Calgary

- Average re-sale house MLS® prices in Calgary fell by 1.7 per cent when oil prices dropped in 2015. In 2016, MLS® prices have recouped their losses and now sit at only 0.6 per cent above where they were in 2014.
- In 2016, residential vacancy rates rose in response to weak economic and demographic conditions. The average residential vacancy rate, for all dwellings, in Calgary was estimated at 4.3 per cent in 2016, up from 2.6 per cent in 2015, and 2.0 per cent in 2014. Specifically, the apartment vacancy rate was 6.9 per cent in 2016, up from 5.3 per cent and 1.4 per cent in 2015 and 2014, respectively.
- We anticipate the residential vacancy rate will remain elevated in 2017 and begin to taper off in 2018. With the residential vacancy rates and the listing-to-sales ratio in the resale housing market at relatively high levels, conditions are currently unfavorable for new home construction.
- Construction activity in the housing sector is expected to remain below average due to lower levels of net migration, household formation rates and reduced pent-up demand expected from 2017 to 2022, combined with higher interest rates. The decline in housing affordability in recent years should also weigh against new home construction. Total annual housing starts in Calgary are expected to fall in 2017 to 7,600 units, and rise to 9,400 units by 2022.
- The office vacancy rate in Calgary is expected to remain elevated above industry norms for the duration of the forecast period.
- The combination of weak population and employment growth and higher interest rates is expected to depress future building permit values. Relatively high vacancy rates in the residential and non-residential markets will also weigh on the construction of new space. The forecast for building permit values is $3.1 billion in 2017 and $5.5 billion in 2022.
- The outlook calls for a decline in transit ridership during the first half of 2017 before employment increases in the downtown core start to slowly reverse the trend. Beyond 2018 adult ridership is expected to increase with population and employment gains.

Calgary Economic Region (CER)

- Economic activity in the CER contracted in 2016 (-1.1 per cent) in response to lower oil prices and reduced capital expenditures. This is the first time since regional GDP data is available (1987) that the economy has contracted for two consecutive years.
- The recession is over. The forecast calls for the economy to expand by 1.9 per cent in 2017 in response to higher oil prices. The CER should grow by 2.3 per cent in 2018, up from 1.9 per cent in 2017 and -1.1 per cent in 2016. The economic recovery would be driven by growth in consumer spending, business investment, government expenditures and net exports.
- Total employment in the CER was estimated at 859,000 in 2016, down from 878,000 in 2015. The forecast for total employment indicates a rebound to 870,000 in 2017, 885,000 in 2018, and 954,000 in 2021 in response to higher levels of economic activity.
- The unemployment rate averaged 9.0 per cent in 2016, up from 6.3 per cent in 2015. The forecast for the unem-

ployment rate is 8.5 per cent in 2017, down from 9.0 per cent in 2016.

- Consumer prices rose by 0.97 per cent in 2016, down from 1.3 per cent a year earlier. The consumer price inflation rate is expected to average 1.8 per cent in 2017 and 2.0 per cent in 2018.
- Non-Residential building costs fell in 2015 and 2016 by a total of 3 per cent. In 2017, price pressures from an increasingly active U.S. economy and lower Canadian dollar will filter into the Calgary construction market causing prices for imported raw materials to rise.

Assumptions

Alberta

- The recent collapse of crude oil prices in 2014 dragged the provincial economy into a two-year recession, as real GDP declined by 3.6 per cent in 2015 and 2.7 per cent in 2016.
- With the stabilization of oil prices, Alberta's economy is set to rebound and grow over the forecast period. Real GDP in Alberta is expected to grow around 2.4 per cent in 2019, before reaching 2.7 per cent in 2020 and 2.8 per cent in 2021.
- Largely helped by the output cuts from OPEC, global crude oil prices finally stabilized in recent months after two years of sharp declines. The annual WTI price was US$43 per barrel in 2016 and is forecast to be US$51 in 2017, and US$55 in 2018, before reaching US$73 by 2022.
- In 2016, Alberta natural gas price (AECO) dropped to $2.1 per GJ, from $2.6 per GJ in 2015. It is forecast to bounce back to $3.0 this year and $3.1 in 2018, before reaching $3.8 by 2022. The subdued price increase is due to the abundance of shale gas resources in North America, especially in the Lower-48 states in the U.S.

Canada

- Real GDP growth in Canada was estimated at 1.3 per cent in 2016, higher than the low of 0.9 per cent in 2015, supported by increases in residential investment, government spending, and exports. The economy is forecast to grow by 2 per cent in 2017 and 2018, before trending down to 1.5 - 1.7 per cent for the rest of the forecast period.
- The Bank of Canada, in anticipating subdued inflation in the next two years, is expected to hold its over-night target rate at 0.5 per cent this year to accommodate growth. However, this super low interest rate environment should change early in 2018 once the inflation pressures in Canada increase.
- The Canadian dollar is expected to dip further this year before appreciating to 76 cents in 2018, and reach above 80 cents from 2019 to 2022.

United States

- The United States real gross domestic product is expected to grow at 2.3 per cent in 2017 and 2.5 per cent in 2018 and average 2.1 per cent per annum between 2019 and 2022.
- The unemployment rate is expected to fall from 4.9 per cent in 2016 to 4.8 per cent in 2017 and to 4.7 per cent in 2018. Without any further slack to exploit in the labor market we expect the unemployment rate to rise averaging 5.0 per cent per year between 2019 and 2022.

World

- World gross domestic product is expected to grow by 3.5 per cent in 2017, followed by an increase of 3.6 per cent in 2018, and average 3.8 per cent per year for the rest of the forecast period.
- Inflation in 2017 is expected to be stronger than 2016, projected at 3.0 per cent, and increase to 3.1 per cent in 2018. Demand pressure is expected to push inflation growth to average 3.2 per cent per year for the remainder of the forecast period.

FORECAST IMPLICATIONS

Variable	2012-2016	2017-2021	Direction of Change	Implications for The City of Calgary
Canada				
Gross Domestic Product (%)	1.8	1.8	Flat	Lack of growth driver in Canadian economy should also impact Calgary's growth prospective.
Prime Business Loan Rate (%)	2.9	3.5	Higher interest rates with tightening of monetary policy	Increased interest service charges do not have a direct effect on The City. However, the impacts would be indirect as services providers pass on increased charges as higher fees to The City.
Canadian/US. Exchange Rate (US$/Can$)	0.88	0.79	Weaker Canadian dollar against U.S. dollar	• Benefits exporting sectors but increases costs of imports and inflation pressures. • Lower exchange rate makes it more expensive to buy large ticket items like LRT cars, busses, vehicles.
Alberta				
Crude Oil Price - WTI (US$/bbl)	75.3	57.3	Down	This should reduce the cost for petroleum based products such as diesel and asphalt for The City.
Alberta Natural Gas Price - AECO/NIT (Can$/GJ)	2.8	3.3	Upward	Modest growth in franchise fees as growth would come mainly from consumption volumes and not from price increases.
Calgary Economic Region (CER) and City of Calgary (City)				
Gross Domestic Product (%) (CER)	2.5	2.6	Flat	• Reduces growth rate for new space; residential and non-residential; • Slower growth in revenue base; assessment and non-assessment. • The economy and revenue base would be larger at the end of this period compared to the previous period.
Total Population ('000 Persons) (City)	1,188	1,277	Modest population growth	• The demand for municipal services would grow at a slower pace; • Increased demand for services specific to immigrants and aging population; • Slower growth in the demand for new residential dwellings; • The City would have a larger population (household) base to service.
Annual Population Growth Rate (%) (City)	2.5	1.2	Slower annual growth	Provides The City with the ability to deal with backlogs.
Net Migration ('000 Persons) (city)	18.5	5.9	Net migration to Calgary will fall as the Calgary's unemployment rate remains high relative to B.C. and Ontario.	Net migration from other provinces is negligible while international migration has not slowed. This will result in a more diverse Calgary.
Total Employment ('000 Persons) (CER)	851	912.0	Modest growth in employment	Increased demand for transit and other services used by businesses.
Annual Employment Growth Rate (%) (CER)	2.3	1.9	Reduced growth rate	Slower growth in non-residential construction.
Unemployment Rate (%) (CER)	6.0	6.9	Higher than previous averages due to slower job creations	Alberta wage settlement should be lower than previous averages. This should reduce the inflation pressures of goods and services that are purchased by The City.
Inflation Rate (%) CMA	1.6	2.1	Upward	Costs that are tied to CPI should escalate over the forecast period at a more modest rate.
Building Permits ($billion) (City)	6.8	4.1	Down	Weigh on building permit revenues.
Transit Adult Ridership (millions trips)	66.1	62.9	Down	Downward pressure on transit revenues.
House Price Inflation (%)	1.9	2.6	Moderate increase due to increased household formation	Housing would remain affordable in Calgary.
Non-Residential Building Price Inflation (%)	0.6	1.1	Increasing inflation pressure from increasing U.S. public infrastructure investments	Prices for non-residential construction activity in Calgary are linked to the U.S. President's success in achieving his goals. This represents an increased upside risk to the construction materials price forecast.

* %: year-over-year percentage change

Forecast Risks

Economic forecasts are always subject to upside and downside risks.

Downside

- For oil exporting nations, a sharply lower oil price has placed significant challenges on petroleum based economies. Such challenges have resulted in recent periods in depressed employment and output growth.
- Added to the economic uncertainties are the various shifts in geopolitical structures across the globe such as the departure of the United Kingdom from the European Union and its potential impact on the global stage. The shift in political ideology in the United States, as political power changed hands from the Democratic Party to the Republican Party in 2016. The new president campaigned on trade protectionism on the one hand and weaker environmental protection on the other.
- Political uncertainty has increased in Europe, with re-emerging tensions over the potential exit of Greece from the EuroZone. This has added to the downside risk generated by geopolitical tension. The funding for terror cells, such as ISIS, which relies on oil revenues will diminish and will weaken their ability to fund terrorist activities around the globe. Russian-Ukraine relations and Russia's relationship with the West will continue to provide further geopolitical tension and downside risks. This uncertainty would weigh on investments spending.
- The U.S. economy is currently operating at or close to its full employment potential and the Chairman of the U.S. Federal Reserve, Janet Yellen, has been signaling since 2016 that rate hikes are in the works as the U.S. economy continues to show strength. A flight of capital from Canada to the U.S. may require the Bank of Canada act accordingly to mitigate this potential risk by raising short-term interest rates.
- The pace of economic growth in China has decelerated as government capital expenditures contract. Economic activity in other Asian emerging and developing markets has also slowed. In Africa, the pace of economic activity is expected to quicken, though the degree of expansion for some, like Nigeria, the largest African economy and a member of OPEC, will be defined by oil price recovery.

Upside

- The weakness in the Euro relative to the United States dollar should provide export opportunities for the Euro zone nations. Additional Euro Zone monetary stimulus by the European Central Bank's quantitative easing program will also bolster Euro Zone growth prospects.
- Since the United States is Canada's major trading partner, a stronger U.S. dollar relative to the Canadian dollar provides a price directed impetus for Canada's manufacturing industry. The ability for the manufacturing industry to capitalize on this opportunity should help mitigate some of the adverse impacts of lower capital investment in Canada's energy sector.
- The new U.S. President has declared that one of his successes will be to re-invigorate U.S. public infrastructure which is said to be in a dilapidated state. Airports, infrastructure along the U.S. southern border and highways are all on the agenda for improvement. U.S. jobs are also targeted to increase, which if successful, will result in increased demand for residential housing. On the whole, a faster growing U.S. economy will result in higher inflation rates in that country. Since many inputs used in construction projects in Canada are imported from the U.S., increased demand for construction materials in the U.S. will also result in increased prices in Calgary. This represents an increased upside risk to the construction materials price forecast.
- There is a significant risk to the housing forecast. Foreign investors have pumped up housing prices in Vancouver for many years, but after B.C. instituted a foreign buyers tax those investors seemed to have moved on to the second-hottest real estate market, Toronto. Ontario is now experiencing rapidly rising house prices that are leaving many locals out of the market. Should Ontario follow B.C. by enacting a foreign buyers tax, it is likely that foreign investors will look to Calgary, the next largest English speaking jurisdiction in Canada where house prices are currently in a slump due to lower oil prices. Should foreign investors descend on Calgary, housing prices could experience rapid escalation.

Forecast

City of Calgary

Real Estate Markets

Residential Sector

- Sales activity tends to increase when prices are rising and falls off when prices drop. During 2012-2014, the Calgary market saw an average of 22,200 dwellings trade hands each year while prices rose by 4 per cent per year on average. In 2016, only 17,800 dwellings traded hands while average prices rose only 2.3 per cent.

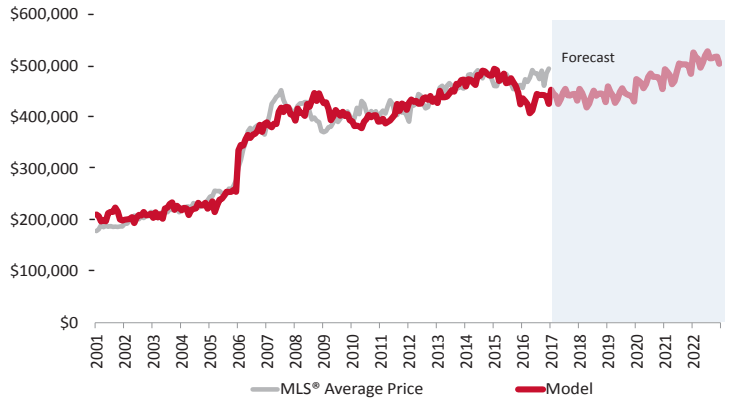
- Average MLS® house prices in Calgary fell by 1.7 per cent when oil prices dropped in 2015. Since then, MLS® prices have recovered, now sitting at only 0.6 per cent above the 2014 peak. Residential prices in Calgary are showing strong resilience to the protracted oil price decline. We anticipate sales will increase slightly in 2017, but prices are expected to remain flat through to the end of 2019 and then resume to more normal increases.

- In 2016, residential vacancy rates rose in response to weak economic and demographic conditions. The reduction in oil prices resulted in lower levels of capital expenditures and related jobs. These factors combined to diminish job prospects, net migration, and population growth in the local economy resulting in reduced demand for residential space. The average residential vacancy rate for all dwellings in Calgary was 4.3 per cent in 2016, up from 2.6 per cent in 2015 and 2.0 per cent in 2014. The apartment vacancy rate was 6.9 per cent in 2016, a level not seen since Calgary's Great Recession of 1982-84.

- We anticipate the vacancy rate will remain elevated in 2017 and begin to taper off in 2018.

- Housing starts in the city of Calgary were esti-

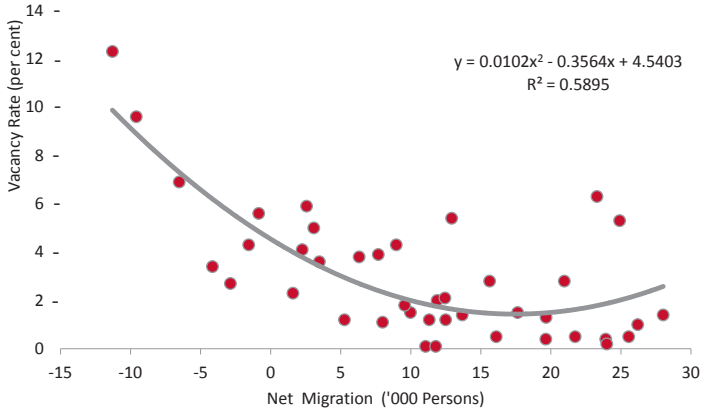
Calgary: Average MLS® Prices vs. Model
(2001 - 2022)



Source: CREB, Corporate Economics

Author: Corporate Economics

Calgary Net Migration and Apartment Vacancy Rate
(1976 - 2016)



Source: C4SE, Corporate Economics

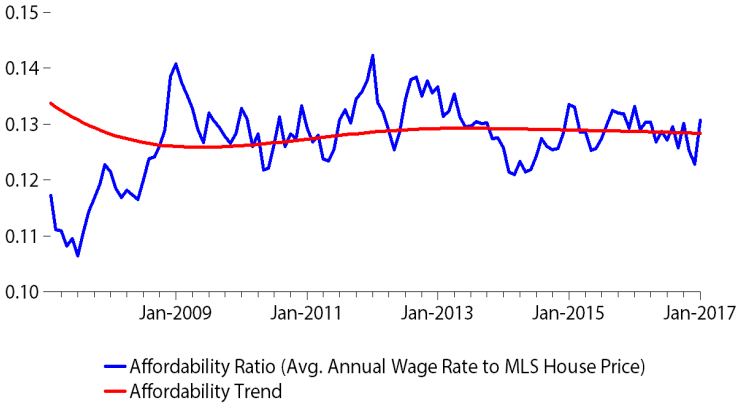
Author: Corporate Economics

mated at 7,777 units in 2016, down from 10,699 units in 2015. The demand for residential space was constrained by market fundamentals including weak employment growth, and household formation in 2016. However, low interest rates provided some support for home purchases.

- With residential vacancy rates and the listing-to-sales ratio in the resale housing market at relatively high levels, conditions are currently unfavorable for new home construction. In addition, many first-time and move-up homebuyers are expected to postpone purchasing decisions because of relatively high unemployment rates and the fear of job loss. Construction activity in the housing sector is expected to remain below average due to lower levels of net migration, household formation rates and reduced pent-up demand from 2017 to 2022, coupled with higher interest rates. The decline in housing affordability in recent years should also weigh against new home construction. Total annual housing starts in Calgary are expected to fall to 7,600 units in 2017, and reach 9.400 units by 2022.

City of Calgary: Housing Affordability

(Mar. 1997 - Jan. 2017)



Source: CREB, StatsCanada, Corporate Economics

Author: Corporate Economics

Commercial Sector

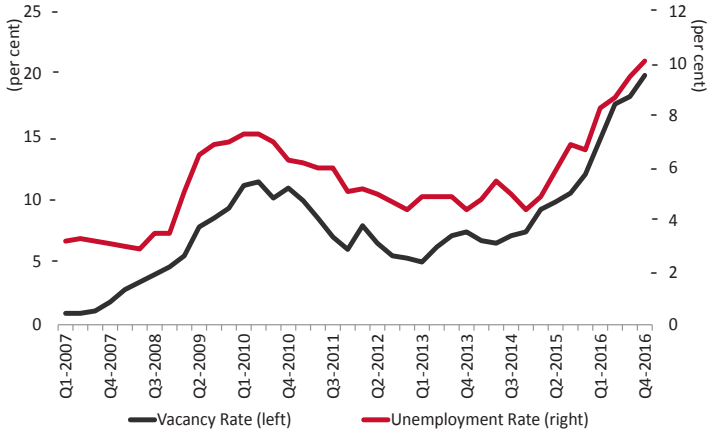
- Calgary has 68.5 million square feet of office space, 62 per cent of which is located in the downtown core, with an additional 11 per cent based in the Beltline.

- Calgary's office vacancy rate for Q1 2017 is estimated at between 20 to 25 per cent, up significantly from a year earlier. In addition, there is about 3.1 million square feet of office space under construction. When completed, we anticipate a shuffling of people as companies take advantage of lower rents to get nicer, more convenient office locations. That doesn't change the fundamental fact that the inventory of office space in Calgary will rise by 3 million square feet soon. More jobs will be needed to fill that space, and those jobs are currently not expected to become available within the forecast horizon.

- About one third of the full-time jobs in Calgary

Calgary Downtown Office Vacancy and Unemployment

(January 2007 - December 2016)



Source: Altus InSite, Corporate Economics

Author: Corporate Economics

are office jobs, so the job market and the office space market are closely tied together. The outlook calls for improvement in the number of employed people in Calgary with the unemployment rate dropping from the current 9.5 per cent to a more normal 6 per cent range by 2021.

- The office vacancy rate in Calgary is expected to remain elevated above industry norms for the duration of the forecast period.
- If not for new office construction currently underway, the office vacancy rate could be expected to drop to the industry normal range of 10 per cent by 2020.

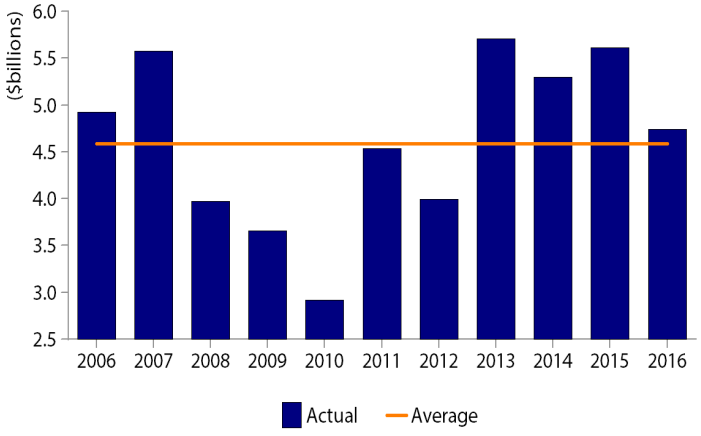
Industrial Sector

- Calgary's industrial sector is also experiencing some reduced demand for space. However, vacancies are concentrated in light industrial use, while medium and heavy industrial space continue to be fully utilized within Calgary.
- The vacancy rate in light industrial space is now at 6.4 per cent, whereas 3 to 4 per cent seems to be the norm. In the northeast part of the city vacancies are over 8 per cent, while in the southeast the majority of light industrial space is experiencing a lower vacancy rate of 6.3 per cent.
- Work in Calgary industrial sectors typically involves manufacturing of final consumer finished products which are used locally. Doors, windows, counter tops, cabinets, and furniture are typically the items that are manufactured. When the population grows, these items are in greater demand and when there is no population growth these sectors suffer.

Building Permit Values

- Total building permit values for the city of Calgary were estimated at $4.7 billion in 2016, down from $6.3 billion for 2015. The forecast is for building permit values to total $3.1 billion in 2017, rising to $5.5 billion by 2022. The combination of weak population and employment growth, coupled with higher interest rates is expected to depress future building permit values. In addition, relatively high vacancy rates in the residential and non-residential markets will also weigh on the construction of new space.

City of Calgary Building Permit Values



Source: The City of Calgary, Corporate Economics Author: Corporate Economics

Transit Ridership

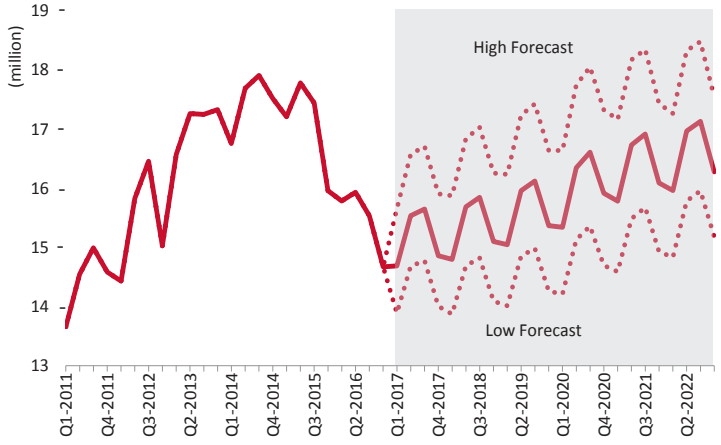
- Calgary Transit adult ridership suffered significant losses in 2016 owing to the particular way in which the oil price downturn affected Calgary. About one third of employment in Calgary is concentrated in the downtown core which has relatively limited and expensive parking but relatively good public transit access. A greater than proportional impact on Calgary Transit ridership is due to the current recession's employment impact being concentrated in Calgary's downtown core. The outlook calls for a continued decline in ridership during the first half of 2017 before employment increases in the downtown core start to slowly reverse the trend.

- We have assumed that pre-programmed price increases for 2016 and 2017 which were the subject of temporary deferrals will be permanently cancelled. Should that assumption prove incorrect then our forecast changes to a 0 per cent increase in ridership in 2018. Beyond 2018 adult ridership is expected to increase with population and employment gains.

- Other ridership includes; Seniors, Youth and riders with access to the U-Pass system. Those rider classes are not responsive to changes in economic conditions like fares and unemployment rates. They are responsive to changes in population sizes, in their own respective age categories, and the forecast reflects those anticipated age-specific changes in the Calgary area.

Calgary Transit Adult Ridership

(Q1-2011 - Q4-2022; trips)



Source: C4SE, Corporate Economics

Author: Corporate Economics

Calgary - Canada's Next Green Energy Hub

Calgary is on the path to becoming a premier green energy hub in North America. This is one of the key findings from the Delphi Group's recently completed study on the Calgary Region's Green Energy Economy. According to Delphi's research, in 2015, Calgary's green energy economy was responsible for generating $3.63 billion in gross output, $1.78 billion in gross domestic product (GDP), and accounted for approximately 15,470 jobs, equal to 1.8% of all workers in the Calgary Economic Region. The study investigated the strengths and opportunities that the Calgary and broader Alberta region have in relation to green energy activities in four sub-sectors:

- Renewable power generation and alternative energy;
- Energy storage and grid infrastructure;
- Green building and energy efficiency; and
- Green transportation.

Some of the key reasons for the growing success of Calgary's green energy economy include:

1. **Broad policy support and financing for green energy sector projects.**
   - At the federal level, funding resources include $120 billion in infrastructure spending, $1 billion for clean technology, and export development in line with the $2.65 billion for international commitments designed to help developing countries lower their carbon emissions.
   - At the provincial level, Alberta's Climate Leadership Plan will provide $3.4 billion toward its Plan and related initiatives, including $645 million for energy efficiency projects over the next 5 years.
   - In addition, The City of Calgary has committed to implementing policies in order to reduce GHG emissions by 20% by 2020 and 80% by 2050, based on 2005 levels.
2. **An abundance of renewable resources.** Alberta has a wide range of some of the best natural renewable energy resources in Canada, including:
   - Wind – 35% of Alberta's land base is suitable for wind energy and only 1% of Alberta's wind energy resources are currently being utilized.
   - Solar – Alberta's solar resource is 25% greater than Ontario's and 30% greater than Germany's.
   - Biomass – 20 million tonnes of annual waste in potential biomass feedstock
   - Geothermal – Numerous orphaned wells in the province and generation potential is upward of 60,000 MW at a depth of 3.5 km.
3. **Extensive project development experience.** Considerable experience exists in the Calgary region for developing a broad range of renewable energy projects including utility-scale wind, solar PV, and hydro, as well as district energy, bioenergy, and commercial-scale and residential solar projects.
   - Alberta was an early leader in Canada with respect to utility-scale renewable energy project development and deployment, having installed the country's first wind farm in 1993.
   - Alberta is the third largest wind producer in Canada (following Ontario and Quebec) and 32% of Canada's installed capacity are from Calgary-based companies.
   - Alberta is home to the largest wind project in Western Canada (300MW); the largest rooftop solar system in all of Canada; and the largest solar PV farm in Western Canada.
4. **A growing cluster of green energy companies.** Calgary is the home of entrepreneurs, investors, research firms, and supporting organizations for numerous companies, large and small, which are helping to grow the green energy sector. There are more than 350 companies operating in Calgary that are active in the green energy economy sectors.
5. **Access to top talent.** The Calgary region and Alberta in general has an abundance of highly-skilled workers with experience in the energy sector, with transferable or applicable skills to the green energy economy, from project design to construction. Some of these skilled occupations include professional engineers, geologists, and geotechnical specialists, trades, and related services such as ICT specialists.
6. **Research and innovation centres of excellence.** Calgary is home to research expertise and a number of world-class institutions focused on developing innovative technologies and solutions in areas that include solar PV, bioenergy, geothermal energy, energy storage and fuel cells, electric vehicles and advanced transportation systems, and green building materials and technology applications. An example includes the Calgary Advanced Energy Storage and Conversion Research (CAESR) Group at the University of Calgary, who are developing technologies and solutions for clean and efficient energy storage and conversion of electricity, such as batteries, electrolyzers, and fuel cells.

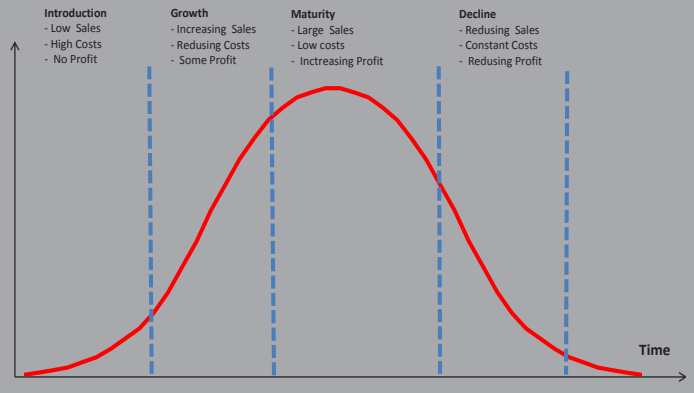
Download the Calgary Region's Green Energy Economy Report (click on the link)

Creative Destruction and the Impact on Calgary

Definition: Creative Destruction is a term coined by the Austrian economist Joseph Schumpeter in his book "Capitalism, Socialism and Democracy". In 1942 he wrote: "The opening up of new markets, foreign or domestic, and the organizational development from the craft shop to such concerns as U.S. Steel illustrate the same process of industrial mutation…that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism."

Illustration: The process of industrial mutation at firm level can be shown from a business life cycle perspective (Figure 1). Like any living being that would experience birth, growth, maturity, and death, a business also goes through the cycle of start-up, growth, maturity, and decline (to extinction).

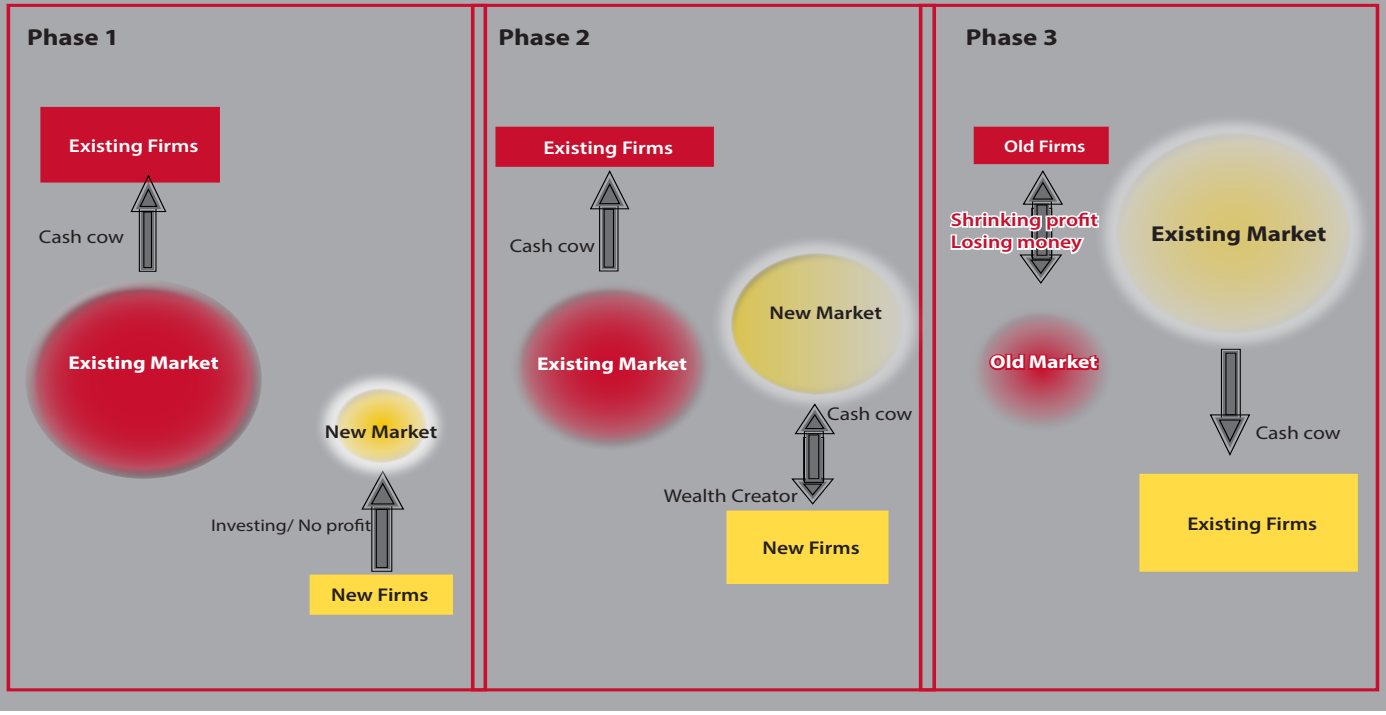
Figure 1 Business Life Cycle



The process of Creative Destruction at industrial level can be illustrated in three phases (Figure 2):

- Phase 1. There is an existing market that is dominated by firms that earn a steady return of profits (cash cow) using older technology. Suddenly, a new market is created by innovative entrepreneurs, who are exploiting new technology, new products, or new ideas. However, the new market is in its infant stage and the existing market is much larger. The existing firms are aware of the new market but decide to stay comfortably in the existing market instead of venturing into the new market.
- Phase 2. The new market is growing at an exponential rate and creates wealth for the innovative entrepreneurs and more workers are hired. As the new market gains in size, some customers from the existing market switch to the new market. The existing market starts to shrink slowly.
- Phase 3. Over time, the new market grows bigger

Figure 2 Creative Destruction



while the existing market loses its share. At some point the existing market starts to shrink even further and some existing firms have to lay off workers or go bankrupt. The existing market becomes the old market and the new market takes over.

At the end of this process, innovation and new technologies created economic benefits for the entrepreneurs and workers in the new market. However, the negative impacts of destruction fall on the firms and employees in the old market, many firms go bankrupt and workers are laid-off.

Examples: There are many examples in history that show the impact of Creative Destruction. Society as a whole has always benefited from creative destruction. With the adoption of new technology, productivity and household income increased, prices of consumer products decreased, and in the end consumer affordability increased. Higher efficiency in production and the work place have combined to provide people all over the world with higher standards of living[1].

However, from the perspective of firms and workers in the old industries, the destructive effects tend to be devastating. For example, the creation of the automobile destroyed the horse-buggy industry, the use of personal computers replaced typists, and the successes of Uber and Airbnb seriously challenge the traditional model of taxi, trucking and hospitality industries.

Implications: A recent study[2] by McKinsey Global Institute (MGI) identified twelve potentially economically disruptive technologies[3] in the next decade or two. Together, they have the potential to transform and disrupt the world economy; with a direct economic impact in the order of $14 trillion to $33 trillion annually by 2025. During this process, job growth is expected in high-skill occupations, while automation of work processes will inevitably impact disproportionately low-skill jobs such as commercial drivers and manufacturing workers. Technological unemployment increasingly becomes a social problem as more people with low education levels fail to find employment. Among the twelve disruptive technologies, Advanced Oil and Gas Exploration and Recovery, and Renewable Energy will have the greatest impact on Calgary. In fact, the local economy has already been impacted by the growing exploration of shale gas and "light tight" oil (LTO) in the U.S. As Alberta's long-time biggest customer, the U.S. is turning into a competitor. Calgary has to realize that the recent two-year recession is not only cyclical but also structural[4]: oil and natural gas prices are not expected to increase quickly, and investments in new oil-sands projects will not return in a similar magnitude that we have experienced in the past.

With so many unemployed workers and struggling businesses, it is urgent to identify emerging trends and find new opportunities for future growth. Organizations need to identify the changing demand for services and make sure they have the financial ability to serve their clients. Local businesses will need to adjust to new market realities, along with governments and institutions, to create an environment to attract young talent that is key for technological progress and economic growth. People in the labour force, especially those underemployed or unemployed, should take a lifelong learning approach to gain new skills and avoid falling into the trap of technological unemployment.

[1] For example, nowadays with a smart phone in hand, people can do many things and more without some other devices that would cost a fortune in the past: land line phones, phone books, notepads, calendars, maps, GPS units, compass, printed newspapers and books, dictionaries, take out menus, fax machines, typewriter, tape recorders, camera, video camera, albums, music machine, VCRs, DVDs, games, security device, alarms, stop watch, timer, calculator, flash lights, remote control, travel directions, and so on. Thanks to the creative destruction.

[2] McKinsey Global Institute (2013) "Disruptive technologies: Advances that will transform life, business, and the global economy"

[3] The twelve technologies include: 1) mobile internet; 2) automation of knowledge work; 3) the internet of things; 4) cloud technology; 5) advance robotics; 6) autonomous and near-autonomous vehicles; 7) next-generation genomics; 8) energy storage; 9) 3D printing; 10) advanced materials; 11) advanced oil and gas exploration and recovery; 12) renewable energy.

[4] North American shale gas production has already reached 350 billion cubic meters (Bcm) annually, supplying more than a quarter of its domestic natural gas production, and LTO production is currently about 1.5 million barrels a day, or nearly 20 percent of total oil production.

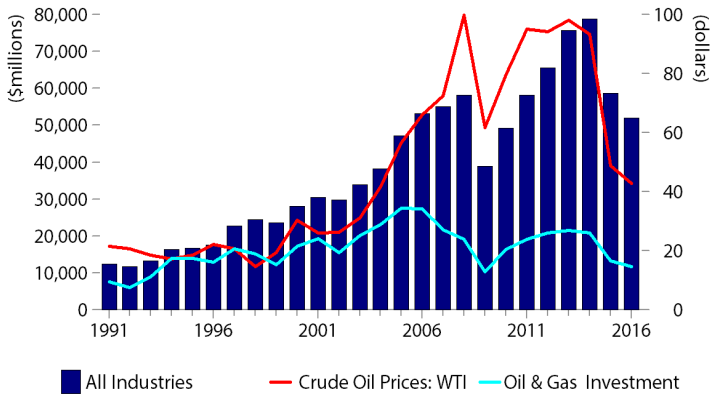
Calgary Economic Region (CER)

The economic recovery of Alberta in general and the Calgary Economic Region in particular, is closely connected to the recovery of world oil prices. The 2015-16 economic recession stands as a reminder that the regional economy is susceptible to external shocks.

Gross Domestic Product (GDP)

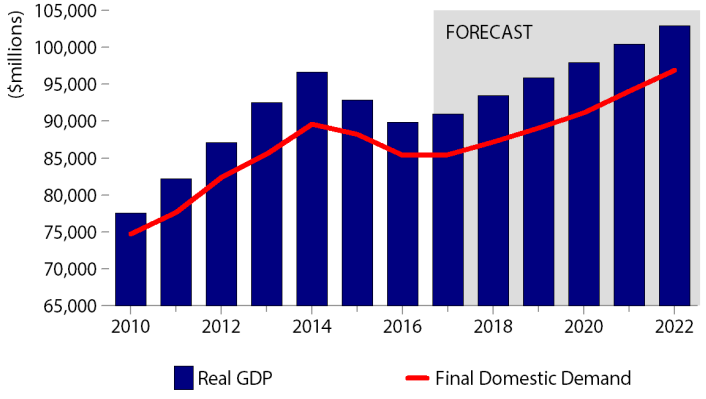
- Economic activity in the CER contracted by 1.1 per cent in 2016 for the second consecutive year, in response to lower oil prices and reduced capital expenditures. This is the first time since regional GDP data is available (1987) that the economy has contracted for two consecutive years. The CER and Alberta economies were adversely affected by lower oil prices that squeezed the energy industry's profit margins and resulted in the postponement or cancellation of several large investment projects in northern Alberta. This reduced the demand for various goods and services in the Calgary area, given its role as the head office location for the energy industry.
- The local economy is estimated to have lost about $4.6 billion in economic output between 2014 and 2016. The economic contraction in this recession is much deeper than that of the global recession of 2008 ($3.8 billion).
- The recession is over. The forecast calls for the economy to grow by 1.9 per cent in 2017 in response to higher oil prices. Businesses should experience increases in their cash flow and this should drive spending on plant and equipment and contribute to job creation and consumer spending and boost overall economic growth. In addition, the rebuilding of Fort McMurray should provide indirect benefits for Calgary as unemployed construction workers from Calgary become employed in Fort McMurray. Increased employment levels would add to labour incomes and provide support for higher levels of consumer spending. Since consumer spending forms about 60 per cent of the local GDP, overall economic activity would be pos-

Alberta Total Investment
(1991 - 2016, $2007)



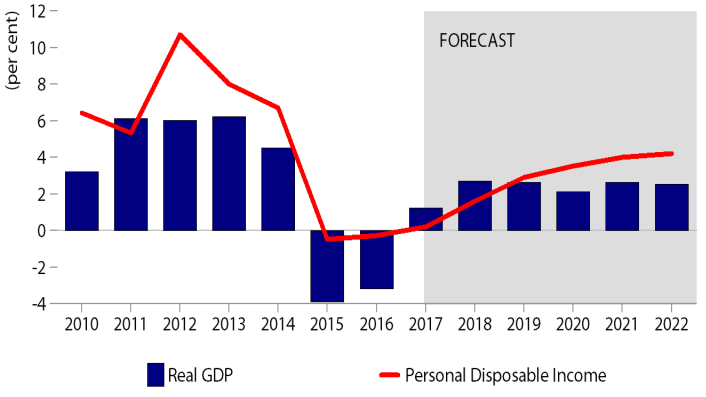
Source: Stats Canada, U.S. FRED, Corporate Economics Author: Corporate Economics

CER Real GDP and Final Demand
(2010 - 2016; Forecast 2017 - 2022; $2007 Millions)



Source: C4SE, Corporate Economics Author: Corporate Economics

CER Growth in Consumer Expenditures and Disposable Income
(2010 - 2016; Forecast 2017 - 2022; $2007)



Source: C4SE, Corporate Economics Author: Corporate Economics

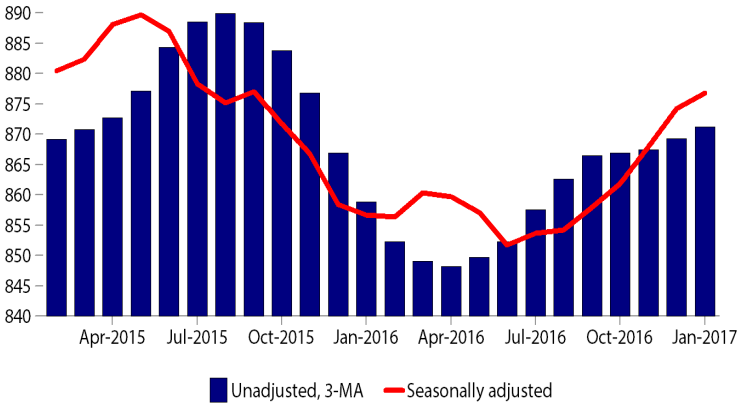
itively affected. The CER should grow by 2.3 per cent in 2018, up from 1.9 per cent in 2017 and -1.1 per cent in 2016. Economic growth would be driven by increase in consumer spending, business investment, government expenditures and net exports.

Total Employment

- Total employment in the CER was estimated at 859,000 in 2016, down from 878,000 in 2015. The recession cost the local economy 19,000 position on a net basis, from peak to trough. The recession was broadly based. The major job losses were in the transportation and warehousing (-12,000), health (-7,000), manufacturing (-6,000) and forestry, mining, oil and gas (-5,000) sectors. While, professional, scientific, and technical services (8,000) and retail trade (6,000) experienced job gains. The monthly labour force survey data showed the recession bottomed out in the summer of 2016 and total employment has been on upward trend since.
- The forecast is for total employment to rebound to 870,000 in 2017 and 885,000 in 2018 and 954,000 in 2021 in response to higher levels of economic activity. Total employment is expected to grow by 100,000 persons for the 2017 - 2022 period; down from 125,000 for the 2010 - 2015 period. Over the forecast period (2017 - 2022), personal income is expected to increase steadily as both wages and employment increase. This would lend support to both consumer spending and residential investment and the overall level of economic activity.

CER Total Employment

(Feb. 2015 - Dec. 2016, '000 Persons)



Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

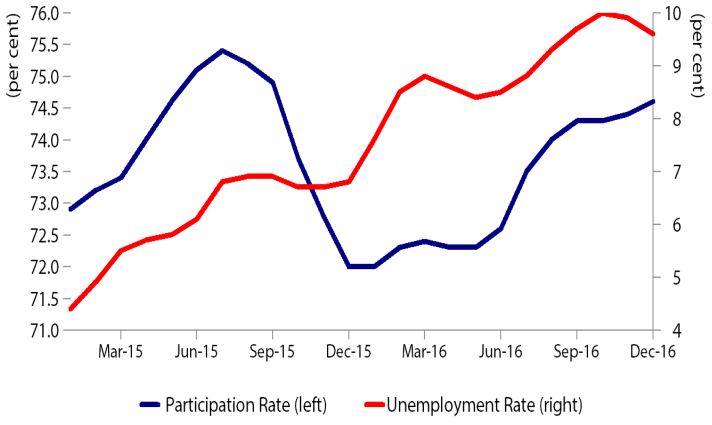
Unemployment Rate

- The unemployment rate averaged 9.0 per cent in 2016, up from 6.3 per cent in 2015. The annual data masks the adjustments in the labour market that occurred during the 2015 – 2016 economic recession. The monthly data shows the rise in the unemployment rate was moderated by a decrease in the growth of the labour force. A change in the unemployment rate generally produces two opposing effects on worker participation in the labour market: the discouraged worker effect and the added worker effect. In this instance, the discouraged worker effect appeared to have crowded out the added worker effect as the labour participation rate peaked in July 2015 in response to dwindling job opportunities and then declined unto January 2016 and remained relatively flat until September 2016. The rise in the participation rate was associated with a monthly increase in employment gains and an upward shift in the unemployment rate as labour force gains outpaced employment increases.

- The unemployment rate is forecast to average 8.5 per cent in 2017 and 7.5 per cent in 2018, down from 9.0 per cent in 2016. The fall in unemployment would result from employment growing faster than the labour force as the recovery gains momentum.

- The unemployment rate for the 2017 – 2022 period is expected to average 6.8 per cent, higher than that for the 2015 – 2020 period (5.4 per cent). This would weigh on wages and net migration levels in Calgary over the forecast period.

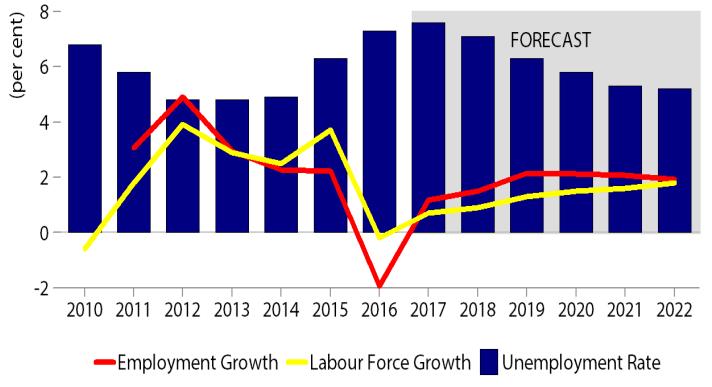
CER Unemployment Rate and Labour Force Participation Rate
(Mar. 2015 - Dec. 2016)



Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

CER Labour Market Dynamics
(2010 - 2016, Forecast 2017 - 2022)



Source: C4SE, Corporate Economics

Author: Corporate Economics

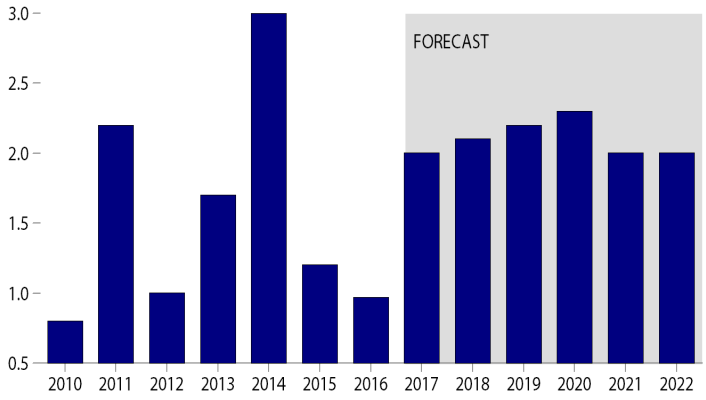
Prices

Consumer Price Index

- Consumer prices rose by 0.97 per cent in 2016, down from 1.3 per cent a year earlier. The consumer price inflation rate is expected to average 1.8 per cent in 2017 and 2.0 per cent in 2018. Inflation rates are expected to increase in response to the combination of higher fuel prices and the imposition of a carbon tax. Higher fuel prices are expected to increase the transportation costs for goods in Calgary and these would be passed on to the consumers in the form of higher prices.

Calgary CMA Consumer Price Index Inflation Rate

(2010 - 2016; Forecast 2017 - 2022, per cent)



Source: Statistics Canada, Corporate Economics

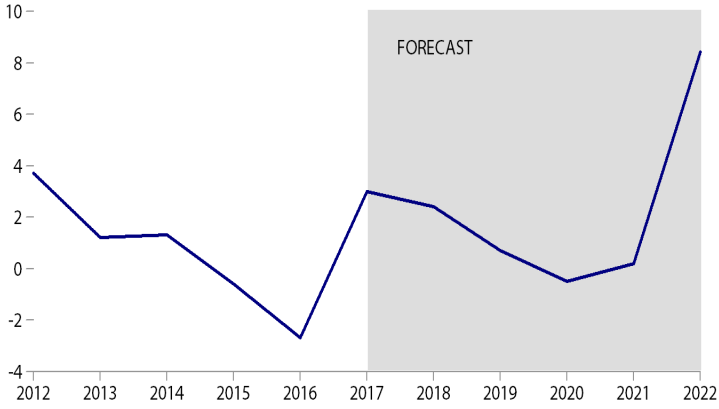
Author: Corporate Economics

Non-residential Building Price Inflation

- Non-Residential building costs fell in 2015 and 2016 by a total of 3 per cent. In 2017 price pressures from an increasingly active U.S. economy and a lower Canadian dollar will filter into the Calgary construction market with prices for imported raw materials increasing.
- Price escalation for steel, rebar, drywall and fixtures is expected to offset cost savings available for labor and materials. Asphalt prices are expected to rise this paving season in response to the recent increase in the price of oil. As such total construction costs for non-residential structures will increase slightly this year.

Non-Residential Building Price Inflation

(2012 - 2016, Forecast 2017 - 2022; per cent)



Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

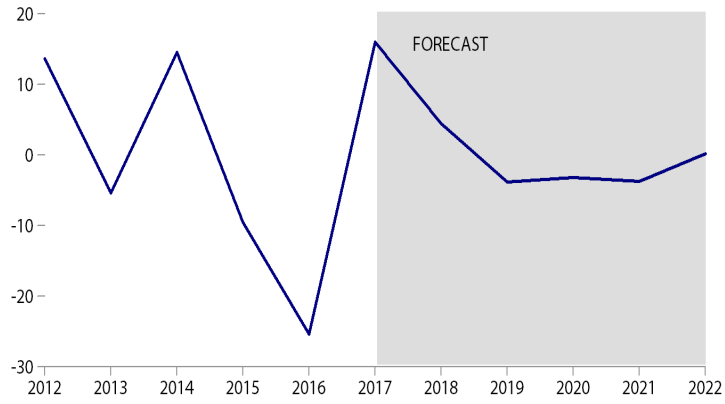
Commodities Prices

Asphalt

- Last year futures asphalt prices dropped by 25 per cent as a result of the precipitous fall in oil prices.
- A lack of progress in getting Alberta oilsands crude to outside markets is impacting local asphalt prices since about half of oilsands crude is asphalt. It is anticipated that there will continue to be bottlenecks impacting Alberta's export capacity throughout the forecast horizon.
- Asphalt prices in Alberta are expected to rise by 16 per cent this year in response to the recent increase

Asphalt

(2012 - 2016, Forecast 2017 - 2022; per cent)



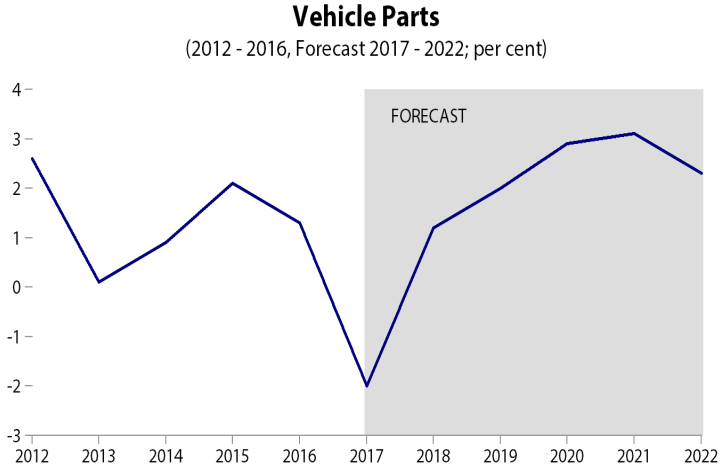
Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

in oil prices, and stabilize in the $600 to $650 per tonne range throughout the forecast horizon.

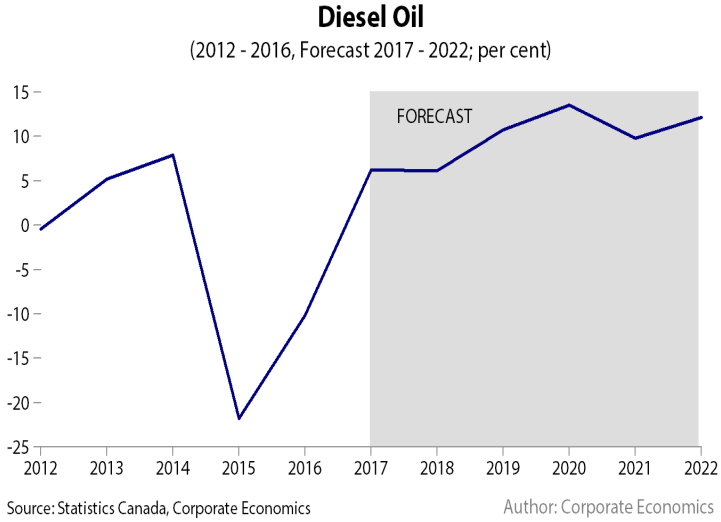
Vehicle Parts

- Vehicle parts are manifactured in Ontario. Recent changes in electricity prices in Ontario have adversely affected Ontario manufacturing. The Ontario Provincial government has recently announced a plan to reduce electricity prices by 25 per cent by a) eliminating the provincial sales tax on electricity and b) by extending the financing horizon of government investments in green energy. Both of those actions transfer today's high electricity prices to current and future taxpayers, which doesn't assist Canada's major manufacturing sector.
- Even if electricity prices drop by 25 per cent in Ontario this year prices will still be extraordinarily high; i.e. 125 percent higher than in Vancouver/Victoria, 135 per cent higher than in Winnipeg, and 50 per cent higher than in Calgary/Edmonton. Traditionally a lower exchange rate with the U.S. made Canadian manufactured goods more attractive. High electricity prices in Ontario are now having the opposite effect.



Diesel

- Diesel prices in Calgary have been steadily marching upward throughout 2016. Starting the year at 84.4 cents per liter prices rose to finish the year at 97.7 cents per liter.
- The new carbon tax combined with increased price of oil has impacted the forecast for diesel prices in Calgary. Previously we were anticipating a stable market with prices in the mid 90 cent per liter range. With oil prices starting to rise and a 5.35 cent per liter tax now in place on diesel fuel, our forecast has changed. If escalation in the new carbon tax continues as planned from $20 per tonne of CO2 today, to $50 per tonne by 2020, then we anticipate diesel prices to escalate accordingly.
- Our forecast for diesel prices is to average 96 cents per liter in 2017 and climb to 106 cents per liter by 2020.



Wood

- The U.S. housing industry is gaining momentum but it is still a far cry from its former glory. From 2000 to 2007, the U.S. averaged 1.4 million single family dwellings per year. In 2016, 0.74 million single family dwellings were built, which was a significant increase from the 0.45 million single family dwellings built in 2011. Still, the 2016 level of activity can be described as "lower than what normally occurs in a normal recession".

- The Canadian Softwood Lumber Agreement is currently up for renegotiation and the U.S. has appointed a staunchly protectionist negotiator. This adds uncertainty to the market, and one thing that uncertainty does is raise prices. With this in mind, we have increased our price forecast over the short term and make the long term assumption that the new softwood lumber agreement between Canada and the U.S. will not be significantly different from today's version. With those two assumptions our model indicates stable Canadian prices for the forecast horizon.

Aluminum

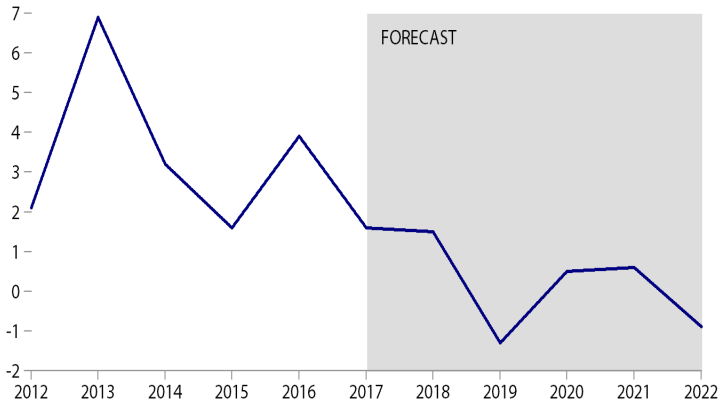
- Aluminum prices are highly volatile and this year's announcement that Chinese growth will be muted is not doing any favors for the commodity.
- Right now there is little in the forecast horizon for any dramatic increases in demand for aluminum. Should the global economy be re-set or should there be a significant change in policy (e.g. should the U.S. decide to build a wall between the US and Mexico using Aluminum as a primary material) the outlook for this construction material may change.

Steel

- Manufacture of pipe used in wells, and machinery and equipment for oilsands production continues to be affected by low oil prices and reduced investment in Alberta's oil industry.

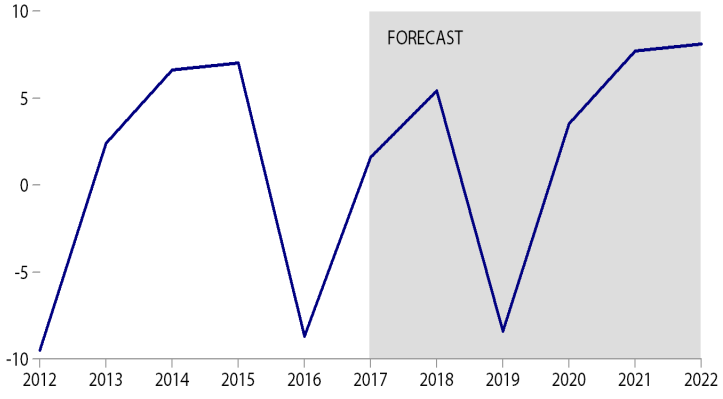
- The shrinking Canadian dollar continues to lift the price of steel, however, new construction activities in the U.S. present a possible uplift to the Canadian steel industry as well. President Trump has said

Wood
(2012 - 2016, Forecast 2017 - 2022; per cent)



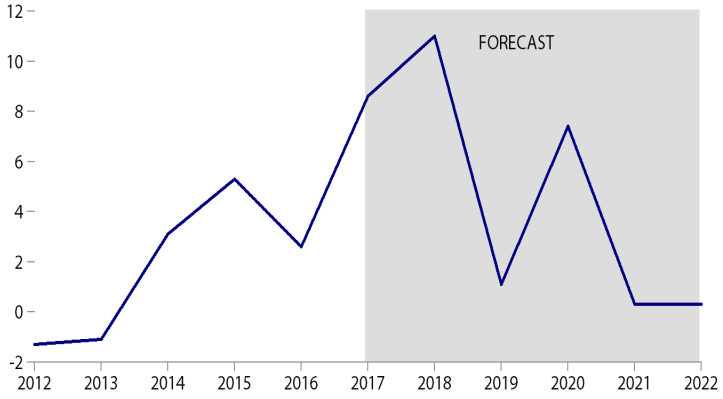
Source: Statistics Canada, Corporate Economics
Author: Corporate Economics

Aluminium Products
(2012 - 2016, Forecast 2017 - 2022; per cent)



Source: Statistics Canada, Corporate Economics
Author: Corporate Economics

Iron and Steel Products
(2012 - 2016, Forecast 2017 - 2022; per cent)



Source: Statistics Canada, Corporate Economics
Author: Corporate Economics

that he wants new pipelines built with U.S. steel and he wants to build a wall across the U.S. / Mexico border. There isn't enough production capacity in the U.S. to supply both of those projects. It is possible that steel manufacturers in Canada, like the U.S. Steel foundry in Hamilton, could supply at least some of the raw materials for the proposed wall.

- Our forecast expects some price run-up over the next couple years and then a more stable environment for steel in Canada.

Rubber

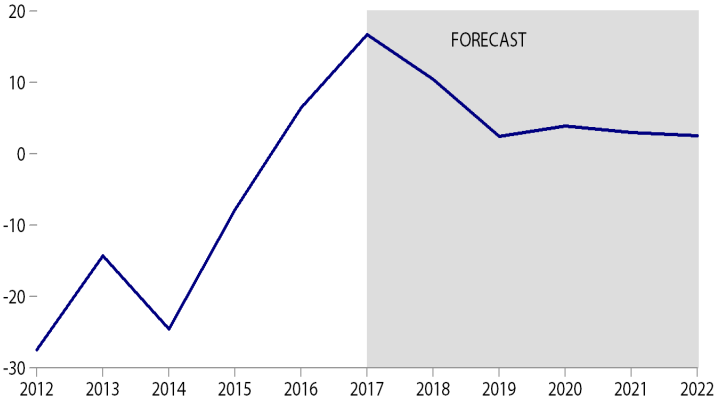
- Rubber compounds around the world are mostly used in the manufacture of tires. As such, oil prices, the general global economy, and the increasing use of personal vehicles militate toward increased usage of rubber.

- With oil prices rising, the price of man-made rubber is climbing this year and will likely continue. The falling Canadian dollar is also boosting the price of rubber used in Canada. A few years ago storms in Malaysia severely impacted natural rubber production potential but now Indian supplies are maturing. Even so, increased road use in the U.S., China and India are pushing demand for rubber upward over the next couple years.

- Our outlook for rubber prices in Canada is increased this year and next. Thereafter, the impact of the low Canadian dollar will taper out of the supply chain and more moderate inflationary pressures should permeate the Canadian market for rubber.

Rubber

(2012 - 2016, Forecast 2017 - 2022; per cent)



Source: Statistics Canada, Corporate Economics

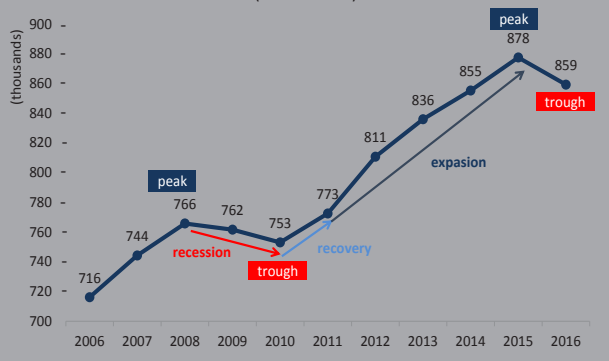
Author: Corporate Economics

Prospects of Current Recovery in the CER Labour Market

Business cycles are the economy-wide fluctuations in production, trade, and general economic activity, around a long-term growth trend. There are four phases in a business cycle: expansion, peak, recession, and trough. An expansion is characterized by increasing economic activities and employment (associated with relatively low unemployment), and upward pressure on prices. A peak is realized when the economy is producing at its maximum allowable output, employment is at or above full employment, and inflationary pressures on prices are evident. Following a peak an economy typically enters into a recession which is characterized by a decline in economic activities that lasts at least two consecutive quarters with lower real GDP, employment (associated with high levels of unemployment) and income levels. The declining phase ends at the trough and at this point the economy has hit a bottom from which the next phases of recovery lead to expansion and finaly ending with a peak.

In the past ten years, the Calgary Economic Region (CER) experienced two recessions: one was the Great Recession triggered by the sub-prime mortgage crisis in the U.S. in 2008, and the other was the recent one driven by the collapse of world oil prices in late 2014. In the Great Recession, the CER lost 12,700 jobs over two years (2009 and 2010), but quickly recovered all the losses and reached new highs within a year in 2011. In the recent recession, however, the job cuts were deeper (-18,300) and took a shorter span from peak to trough (one year in 2016) (Chart 1).

Chart 1 CER Total Employment
(2006 - 2016)

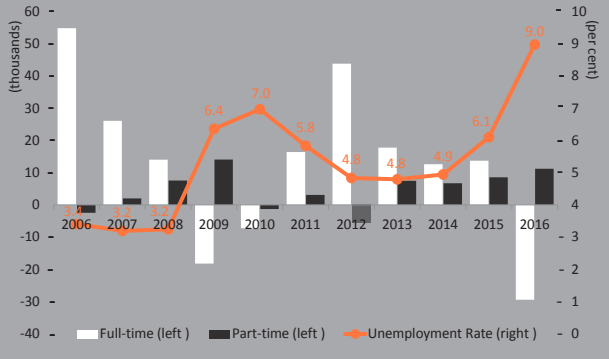


Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

Normally during a recession, part-time job creation tends to partially offset full-time job loss. This is explained by two hypotheses: (a) individuals need incomes to survive and (b) employers try to reduce costs. As more people compete for fewer jobs, the available jobs tend to be less desirable and lower paid. Some job seekers may elect to work part time because of the lack of full time employment. In this environment of low economic activity, employers would tend hire part-time workers to contain business costs. If the recession is prolonged, some long-term unemployed, especially those who run out of employment insurance benefits may choose to leave the local labour market for job opportunities outside of the region. Others disappointed with the prospect of finding employment may drop out of the market and leave the labour force. Generally in an economic recession, the labour participation rates tend to fall because workers' chances of finding employment are drastically reduced and they therefore become discouraged and leave the labour market. The unemployment rate is therefore kept artificially low during a recession.

Chart 2 CER Labour Market Dynamics
(2006 - 2016)



Source: C4SE, Corporate Economics

Author: Corporate Economics

After the trough, an economy enters into recovery. Economic activities start to pick up and firms resume hiring. Over time, more jobs are available and many unemployed are absorbed in the labour market, resulting in a lower unemployment rate. A declining unemployment rate means that firms now have to compete with each other for workers by offering full-time positions and better wages. Some part-time workers would quit their low-pay jobs for better paying full-time opportunities.

Currently in the CER, the unemployment rate (9 per cent in 2016) was much higher than the one after the Great Recession (7 per cent in 2010). With more full-time jobs lost in the recent recession, this time in the CER the labour market recovery is expected to take longer than last time in 2011 (Chart 2).

The Inter-Industry Structure of the Calgary Economy

In 2013, Calgary's share of total employment in Alberta was estimated at 38 per cent, while accounting for about a third of the province's population. A total of 236 industry sectors in Canada have been classified by Statistics Canada of which 220 industries have been identified in the Calgary Economic Region. An Input Output Model for the Calgary Economic Region was developed to provide an understanding of the industry structure[1] of the local economy. The resulting matrix shows how the output of one industry could be used to provide input to other industries.

The Input Output Model highlights and quantifies the linkages of the economy's structure or supply chain by showing how a dollar increase in output in a given industry would affect the total sales of the economy as a whole. This result is generally referred to as the multiplier effect. For the 220 industry subsectors, we have quantified, the total sales activities generated in the Calgary economy is termed the Input Output Multiplier. The larger the multiplier, the larger the potential supply chain, assuming all things are equal. These multipliers are used to estimate the impact of investment spending on the Calgary economy.

The structure of the economy could be analyzed by comparing the average multiplier against the multiplier of each industry. Using this method, 11 subsector industries have the strongest supply chain linkages in the Calgary economy irrespective of employment size of the industry identified. These sub-sectors belong to 5 industry sectors: Agriculture, Manufacturing of Wood and Rubber, Utilities, Construction, and Manufacturing of Food and Clothing.

A table of summary of the first 11 industries with significant links to other industries are highlighted in order of significance.

Industry Subsectors	Industry Sectors	Rankings
Petroleum refineries	Manufacturing Wood Rubber	1
Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing	Manufacturing Wood Rubber	2
Animal production (except aquaculture)	Agriculture	3
Converted paper product manufacturing	Manufacturing Wood Rubber	4
Forestry and logging	Agriculture	5
Other chemical product manufacturing	Manufacturing Wood Rubber	6
Rubber product manufacturing	Manufacturing Wood Rubber	7
Meat product manufacturing	Manufacturing Food Clothing	8
Plastic product manufacturing	Manufacturing Wood Rubber	9
Water, sewage and other systems	Utilities	10
Transportation engineering construction	Construction	11

[1] The 220 industry subsectors can be summarized into 31 or 17 aggregate industry sectors

Alberta Carbon Levy

Alberta Carbon Levy

In 2016 the Provincial government initiated a carbon levy. Starting in 2017 on the basis of $20 per tonne of CO_2 and rising to $30 / tonne of CO_2 in 2018. The following items are subject to the new levy:

Type of Fuel	1-Jan-2017 $20/tonne	1-Jan-2018 $30/tonne
Market Farm Fuels	Exempt	Exempt
Diesel	+5.35 ¢/L	+2.68 ¢/L
Gasoline	+4.49 ¢/L	+2.24 ¢/L
Natural Gas	+1.011 $/GJ	+0.506 $/GJ
Propane	+3.08 ¢/L	+1.54 ¢/L

Source: Alberta Treasury Board and Finance

This will impact residents and businesses in Alberta but there are some significant exemptions to this levy:

- The airline industry, for flights into and out of Alberta
- Agricultural uses
- First Nations
- Fuel destined for export

Municipalities, in particular, public transit systems in Alberta are not exempted from this levy. Preliminary estimates of the financial impact of this levy on The City of Calgary are: $5 million in 2017 and $8 million in 2018. Should the Province elect to follow the Federal Government's plan to raise the levy to $50 / tonne over the next 5 years, the financial impact to The City of Calgary will rise to $18 million per year.

The Carbon levy is expected to raise almost $10 billion over the next 10 years in provincial revenues. Those revenues are currently earmarked to be spent in the following way:

- 65% to "diversifying the Alberta energy industry and creating new jobs"
  - 55% to large scale renewable energy ($3.4 billion)
  - 35% to green infrastructure ($2.2 billion)
  - 10% to a new program to support energy efficiencies in homes
    - » Program details released so far reveal this is free light bulbs and programmable thermostats installed in homes at no additional cost to home owners.

- 35% to helping people adjust to the new levy
  - 68% in rebates to families, details below
  - 25% to pay for a reduction in the small business levy rate from 3% to 2%
  - 6% in community assistance

Rebates are available on an income basis; 100% rebates to singles who earn $47,500 or couples who earn $95,000 or less.

Impact on Carbon Emissions

- Corporate Economics has estimated the impact on carbon emissions in the Province of Alberta from the gasoline and diesel carbon levy. The estimated 2017 CO_2 emission reductions from reduced gasoline consumption as a result of this levy amounts to 0.01% of the 15.5 million tonnes of CO_2 emitted from burning gasoline in Alberta annually.

- The expected 2017 CO_2 emission reductions from diesel consumption attributable to the new levy is 1% of the 12.6 million tonnes of CO_2 emitted in Alberta annually.

Large Industrial Emitters

If the goal is to reduce greenhouse gas emissions in Alberta more needs to be done. Large industrial emitters, those that emit more than 100,000 tonnes of CO_2 are required to reduce their emissions by 20% in 2017. To reach that goal they may a) reduce emissions, b) transfer reduced emissions from another facility that has over-reduced in Alberta, c) buy Alberta carbon credits and/or d) pay $30 / tonne to a new Fund.

Commercial activity in Alberta's oil sands accounts for 25% of Alberta's emissions, about 70 of Alberta's 280 MT / yr (MT=million tonnes). Currently each producer pays a levy based on historical emissions from each facility. The proposal for future emissions is an oil sands cap, currently proposed at 100 MT/ yr, along with a charge of $30 / tonne for emissions beyond a yet to be announced site specific efficiency target. Since the intent of the Provincial government was announced some oil sands producers have announced that they intend to leave several billion barrels of recoverable oil "in the ground" in Alberta.

Sources of CO_2 in Alberta

Sector	Million tonnes / yr
Fuels burned to generate electricity	47
Fuel burned during mining *	73
Mining fugitive emissions	37
Other Oil and Gas **	30
Transportation (gas, diesel, propane)	28
Other industry; Manufacture & Construction	25
Businesses & Houses***	25
Agriculture, Forestry & Waste	25

* Includes pipeline transportation of oil and gas within Alberta
** Includes emissions from upgrading, refining and production of chemicals and plastics
*** Predominantly from combustion of natural gas in space heating

Sources:

- City of Calgary; Corporate Economics
- City of Calgary Energy Management Office
- Province of Alberta; Carbon levy and rebates: https://www.alberta.ca/climate-carbon-pricing.aspx
- Conference Board of Canada; Greenhouse Gas Emissions by Province: http://www.conferenceboard.ca/hcp/provincial/environment/ghg-emissions.aspx
- Pachon & Webber, "Taxing the Tar Sands", Kleinman Centre for Energy Policy, University of Pennsylvania, 2017: http://kleinmanenergy.upenn.edu/policy-digests/taxing-tar-sands

Assumptions

Alberta

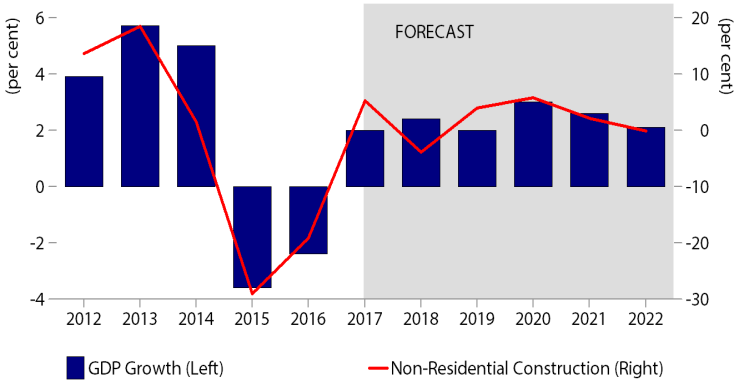
Real GDP Growth and Non-residential Investment

- In recent decades, economic growth in Alberta has been driven by investments in unconventional oil. The collapse of crude oil prices in 2014 dragged the provincial economy into a two-year recession, as real GDP declined by 3.6 per cent in 2015 and 2.7 per cent in 2016.

- The worst is over. With the stabilization of oil prices, Alberta's economy is set to rebound and grow over the forecast period. Increases in government infrastructure spending should provide short-term stimulus, and the massive rebuild in Fort McMurray after last year's wildfire will also contribute to growth. Real GDP in Alberta is expected to grow around 2.4 per cent from 2017 to 2019, before reaching 2.7 per cent in 2020 and 2.8 per cent in 2021.

Alberta: Real GDP Growth vs. Non-residential Construction

(2012 - 2016; Forecast 2017 - 2022)



Source: Statistics Canada, Corporate Economics

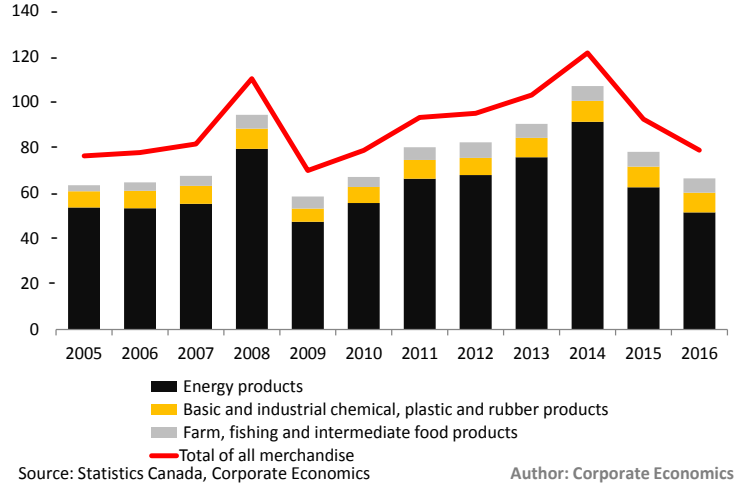
Author: Corporate Economics

Domestic Export by Major Product

- Increasing export demand for Alberta's energy products (first natural gas and later unconventional crude oil) has being the driving force behind the province's fast growth in the recent years. The total value of all merchandise exports from Alberta ranged from $70 billion to $110 billion annually in 2005-2016, representing a share of 55 to 59 per cent GDP values in the province. Among all merchandise, energy products accounted for 65 to 75 per cent of total export value. As a result, the recent collapse of crude oil prices reduced the export values of energy products (-$29 billion in 2015 and -$24 billion in 2016), despite increases in shipment volumes. Over the next five years, exports of crude oil products are expected to increase in volumes, a result of completions of large scale oil-sands projects. The increase in production capacity will add to output.

Alberta: Domestic Export by Major Product

(2005 - 2016; $billions)



Source: Statistics Canada, Corporate Economics

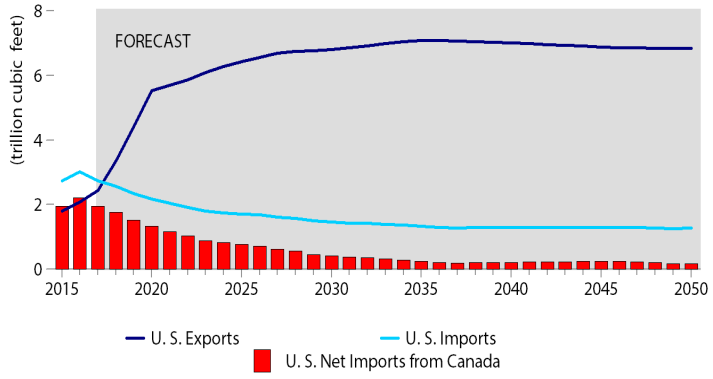
Author: Corporate Economics

Energy Market Dynamics in North America

- The energy market dynamics in North America has changed dramatically in recent years, driven by the technological advances in oil and gas exploration and recovery. Historically, natural gas shipments to markets in North America have been by pipeline from Canada to U.S. and from U.S. to Mexico. Since the shale gas revolution, the U.S. has become a major natural gas producer and began to export liquefied natural gas (LNG) to international markets. According to the U.S. Energy Information Administration (EIA), the U.S. will be a net exporter in the world natural gas market by 2018. Its imports of natural gas from Canada are expected to decline significantly in the coming years.
- The same scenario could happen to the crude oil market. Currently, shale oil production in the U.S. is already competing with Saudi's oil production. With the U.S. building up its own shale oil production capacity and Alberta facing pipeline bottlenecks, the market outlook for Alberta' crude in the U.S. appears to be limited.

Alberta: U.S. Natural Gas Pipeline Import-Export Volumes

(2015 - 2016; Forecast 2017 - 2050)



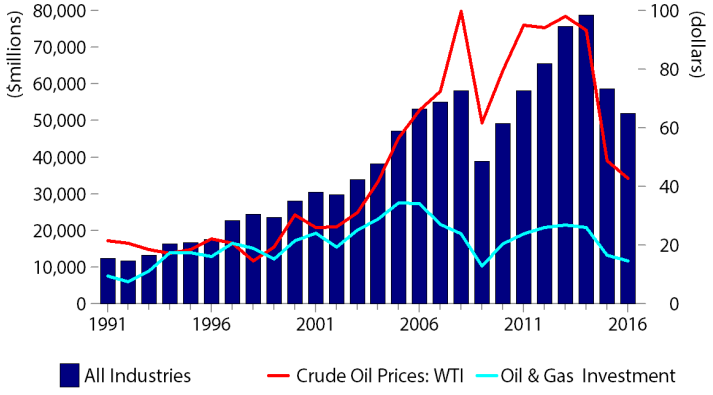
Source: U.S. Energy Information Administration, Corporate Economics Author: Corporate Economics

Energy Prices and Investment in Alberta

- The status of the world crude oil market could be summarized as one that is faced with abundant supplies and relatively weak demand. The annual WTI price was US$43 per barrel in 2016, and is forecast to be US$51 in 2017 and US$55 in 2018, before reaching US$73 by 2022. The increase of WTI prices is expected to be moderate, constrained by the new supply capacities such as shale oil fields in North America.
- In 2016, Alberta natural gas price (AECO) dropped further to $2 per GJ, from $2.6 per GJ in 2015. It is forecast to bounce back to $3.0 this year and $3.1 in 2018, before reaching $3.5 by 2022. The subdued price increase is due to the abundance of shale gas resources in North America, especially in the Lower-48 states in the U.S.
- Lower than boom year energy prices should adversaly affect new investments in Alberta's oil and gas fields. However, with recent and upcoming completions of large oil sands projects the province should benefit from increasing energy product exports, both in income and in taxes.

Alberta Total Investment

(1991 - 2016, $2007)

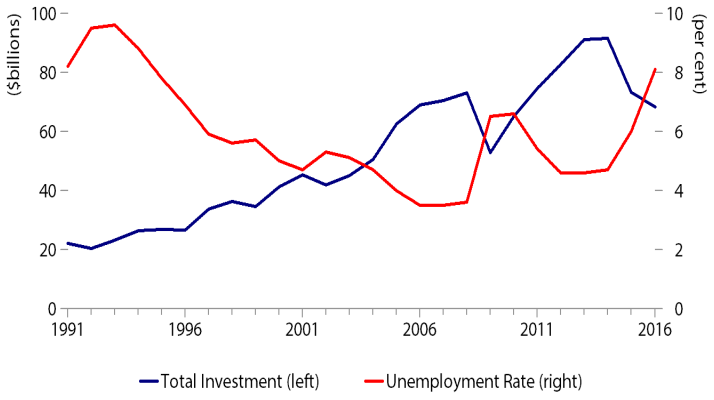


Source: Stats Canada, U.S. FRED, Corporate Economics Author: Corporate Economics

Investment and Labour Market Dynamics

- Total investment (in $2007) in AB increased dramatically from $22 billion in 1991 to the recent peak of $92 billion in 2014, thanks to continuously rising oil prices which were driven by the super commodity boom. These investments brought the province large numbers of highly paid, full-time jobs, which attracted a large number of job seekers from outside. Prior to 2015, the unemployment rate in Alberta was consistently lower than the rest of Canada, pushing up wages and inflation in the province.
- Rising oil prices before 2014 produced a sharp supply response and this pushed prices lower from 2014 to present.
- The collapse of crude oil prices resulted in sharp reductions in capital spending and deep job cuts across Alberta in 2015 and 2016. The province's 8.1 per cent unemployment rate in 2016 was the highest in Canada. Although the worst is over, the changing energy market dynamics in North America should prove to be challenging for Alberta to attract new investments and create new jobs. As a result, job recovery in Alberta is expected to be slow this time. The unemployment rate is forecast to increase slightly this year to 8.3 per cent, before declining to 7.7 per cent in 2018 and 6.2 per cent in 2022.

Alberta: Investment vs. Unemployment Rate
(1991 - 2016)



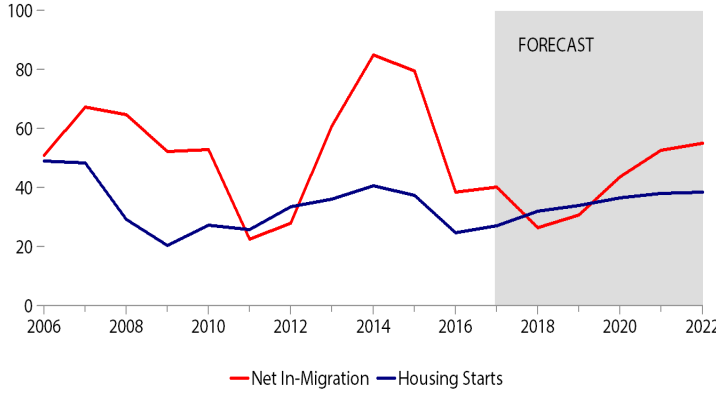
Source: C4SE, Corporate Economics

Author: Corporate Economics

Population Growth and Housing Starts

- Demand for housing in Alberta has been high in the past decade, driven by a strong job market and a large inflow of migration. The number of housing starts has followed the pattern of net-in migrations, ranging from 20,000 units to 49,000 units a year. With a slow recovery and moderate job creation in the next five years, net-in migration should fall below pre-recession levels. However, relatively affordable housing prices in Alberta should support demand for housing and residential investment. The total number of housing starts is expected to rebound to 25,000 units in 2017, and gradually increase to 32,000 units by 2022.

Alberta: Migration and Housing Starts
(2006 - 2016, Forecast 2017 - 2022; thousands)



Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

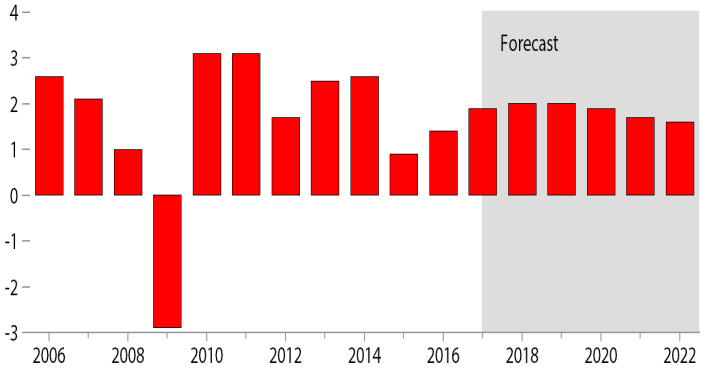
Canada

Real GDP Growth and Fiscal Policy

- Real GDP growth in Canada was estimated at 1.3 per cent in 2016, higher than the recent low of 0.9 per cent in 2015, supported by increases in residential investment, government spending, and exports. The economy is bouncing back helped by the recovery of commodity prices and is forecast to grow by 2 per cent in 2017 and 2018, before trending down to 1.5-1.7 per cent levels for the rest of forecast period. Proposed fiscal stimulus from the federal government should contribute to short-term growth and create jobs by boosting infrastructure investment. However, an aging population and high household debt level should limit future growth in household consumption.

Canada: Real GDP Growth

(2006 - 2016, Forecast 2017 - 2022; per cent)



Source: C4SE, Corporate Economics

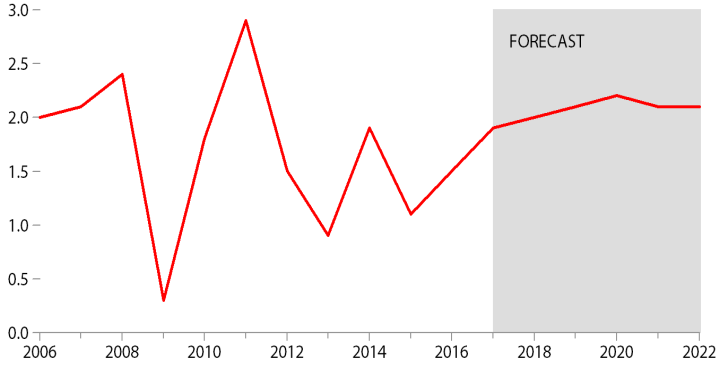
Author: Corporate Economics

Excess Capacity and CPI Inflation

- In the past two years, the Canadian economy coped with the sudden collapse of energy prices by shedding jobs and cutting production. As a result, considerable excess capacities were built up in the economy and reducing inflation pressures on wages and consumer prices. The CPI inflation rate was 1.5 per cent in 2016, up from 1.1 per cent in 2015, largely reflecting low food and consumer energy inflation. It is expected to increase to 1.9 per cent this year, with the reduction of excess capacities in the economy and rising inflation pressures from a weak dollar. From 2018 to 2022, the CPI inflation is expected to be close to the 2 per cent target rate, as excess capacity in the economy dissipates and inflation pressures come back from energy costs.

Canada: CPI Inflation

(2006 - 2016, Forecast 2017 - 2022; per cent)



Source: C4SE, Corporate Economics

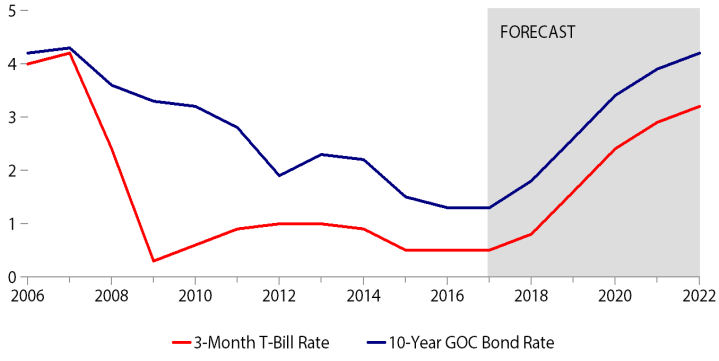
Author: Corporate Economics

Monetary Policy and Interest Rate

- The Bank of Canada, in anticipating subdued inflation over the next two years, is expected to hold its over-night target rate at 0.5 per cent to accommodate growth. Last December, the U.S. Fed hiked its fund rate. For the first time since 2007, the Canadian overnight rate fell lower than the Fed fund rate. Currently, the commercial bank's short-term interest rates and long-term government bond rates are both at historical lows. However, this low interest rate environment should change early in 2018 once inflationary pressures in Canada increase. The Bank of Canada is expected to normalize interest rates in the medium- to long-term, following Federal Bank of U.S. actions expected this year.

Canada: Interest Rates

(2006 - 2016, Forecast 2017 - 2022; per cent)



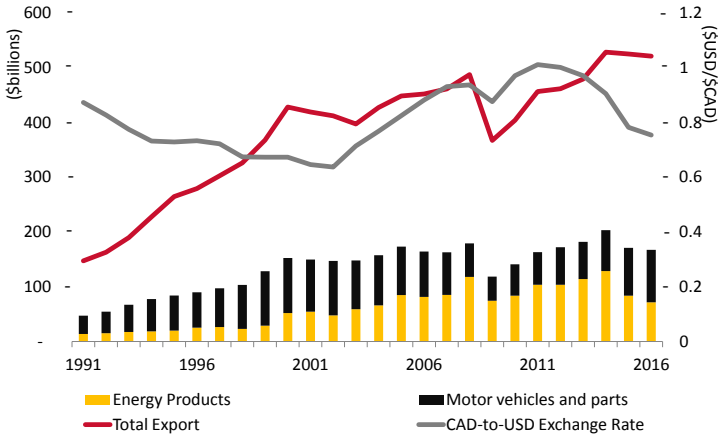
Source: C4SE, Corporate Economics

Author: Corporate Economics

Exchange Rate and Export by Product

- The Canadian dollar depreciated further against the U.S. dollar in 2016, due to weak commodity prices and strengthening of the U.S. economy and its currency. The Canadian dollar is expected to dip further this year before appreciating to 76 cents in 2018, and reach above 80 cents from 2019 to 2022. Historically, a weak dollar is good for export sectors, such as automobile and energy industries. However, increasing uncertainty from trade protectionism by the Trump Administration may bring significant downward risks to the outlook of growth in exports.

Canada: Exchange Rate vs. Export by Product
(1991 - 2016)



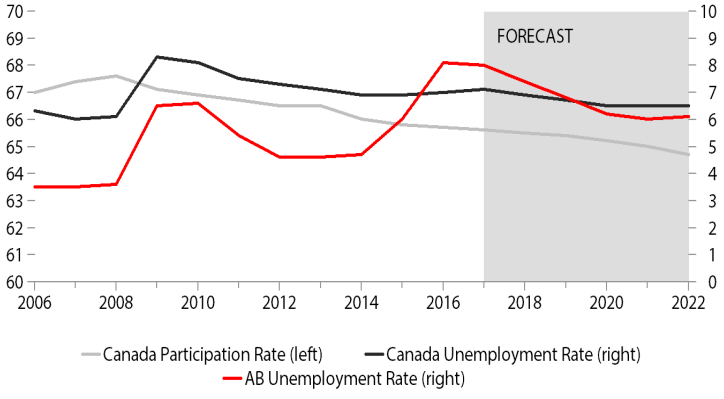
Source: C4SE, Corporate Economics

Author: Corporate Economics

Labour Market and Consumption

- Job creation in Canada was much lower in 2016 compared to levels seen over the past decade. Despite the lack of job creation, the unemployment rate remained relatively low. The aging baby boom generation is weighing on growth in the labour force as members of this cohort choose to retire. In addition, the lack of job creation appears to be discouraging working age members of the cohort from looking for employment.
- The unemployment rate is expected to increase slightly in 2017, as more unemployed people look for jobs again. In 2018 and 2019, the national unemployment rate should decline steadily reaching 6.5 per cent in 2020-2022. This is partly helped by the recovery of regional labour markets from the commodity-driven recession. More importantly, the aging population should result in declining labour participation rates and reduce competition for jobs.

Canada: Unemployment Rate vs. Participation Rate
(2006 - 2016, Forecast 2017 - 2022; per cent)



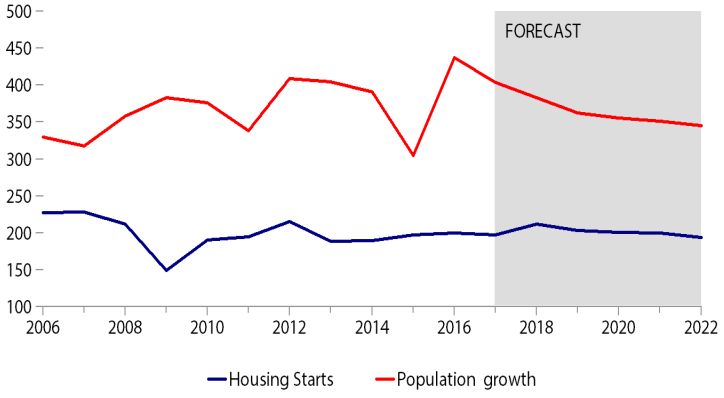
Source: C4SE, Corporate Economics

Author: Corporate Economics

Population Growth and Housing Starts

- Residential investment in the Canadian housing market has been a strong growth driver in recent years. Historically low mortgage rates since the Great Recession of 2008 has encouraged home ownership. Strong job creation in the energy-export provinces prior to the oil market collapse coupled with a steady increase of immigrants (from 247,732 in 2011, to 300,000 in 2016) have helped push housing starts to around 190,000 units annually in recent years. However, over the rest of the forecast period, an aging population and deterioration of affordability should put a cap on housing starts.

Canada: Population Growth vs. Housing Starts
(2006 - 2016, Forecast 2017 - 2022; thousands)



Source: C4SE, Corporate Economics

Author: Corporate Economics

Impacts of a Trump Trade Policy on the Canadian Economy

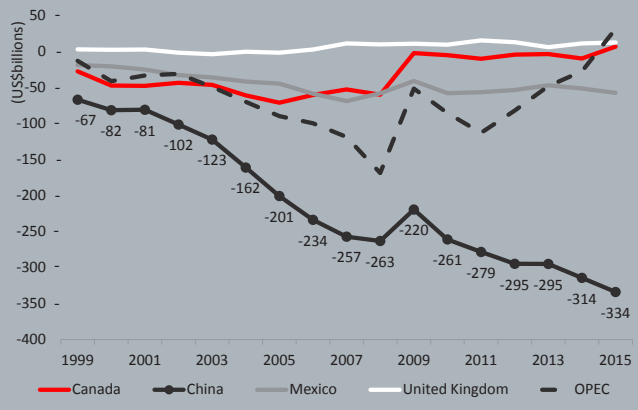
The recent change in the U.S. Administration has increased uncertainties around the Canada and U.S. trade relationship, with President Trump's promise to re-negotiate the North American Free Trade Agreement (NAFTA)[1] or even withdraw from it. The twenty-two year old trade deal, along with others, have been blamed by the Trump Administration as"blue-collar towns and cities have watched their factories close and good-paying jobs move overseas, while Americans face a mounting trade deficit and a devastated manufacturing base"[2].

Statistics[3] show that the U.S. has had increasing international trade deficits with China and Mexico. This is explained by the fact that although the top three U.S. export markets were Canada, Mexico and China, its top three import markets were China, Canada and Mexico (Chart 1and 2). In 2015, the U.S. had a US$334 billion trade deficit with China and a US$58 billion trade deficit with Mexico.

Until now, the NAFTA renegotiation talks in Washington were mainly focused on Mexico. A radical change to tariff policy under NAFTA or a withdrawal from it, could shock the Canadian economy along with the U.S. and Mexico. It could disrupt cross border supply chains and transform import and export patterns, hurting businesses and consumers in North America with increasing costs of production and prices of goods and services. In fact, the three countries have such tightly interconnected economies that raising trade barriers today could hurt all of them. Instead of bringing back manufacturing jobs to America, protectionism could end up causing more job losses, not only in Mexico and Canada, but also in the U.S.

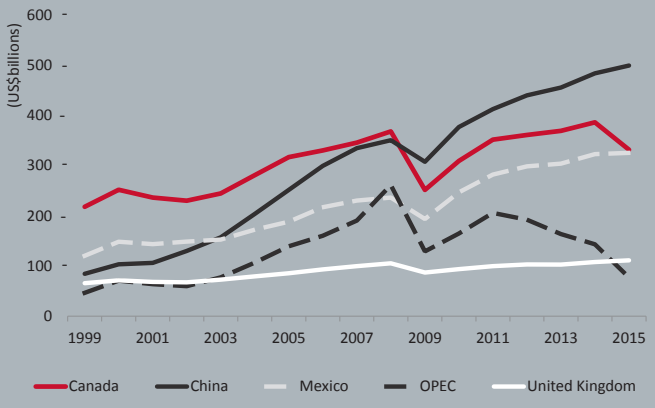
Canada is a small open economy that is increasingly dependent on international trade. Measured by expenditure values, export accounted for 32 per cent of the nation's real GDP in 2016, up from 23 per cent in 1991. Among all its trading partners, the U.S. is the single most important one to Canada. Over the years, Canada enjoyed trade surpluses with the U.S., especially during the commodity super boom from 2000 to 2008 (Chart 3). From 1997 to 2016, Canada shipped between 74 per cent and 84 per cent of its annual total export values to the U.S. During this period, the U.S. was the source for between 62 per cent and 77 per cent of all Canada's imports. The dollar value for imports and exports between Canada and the U.S. has grown steadily over time. Through the supply chains, Canada's two biggest industries (energy and automobile) are more integrated with its U.S. counterparts today than ever before.

Chart 1 U.S. Trade Balance on Goods and Services by Selected Countries
(1999 - 2015)



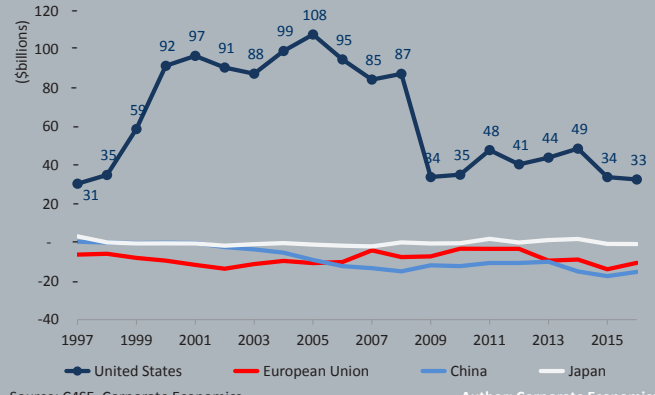
Source: U. S. Bureau of Economic analysis, Corporate Economics **Author: Corporate Economics**

Chart 2 U.S. Imports of Goods and Services to Selected Countries
(1999 - 2015)



Source: U. S. Bureau of Economic Analysis, Corporate Economics **Author: Corporate Economics**

Chart 3 Canadian Trade Balance with Principal Trading Partners
(1997 - 2016)



Source: C4SE, Corporate Economics **Author: Corporate Economics**

[1] Since its inception in 1994, NAFTA has eliminated duties on thousands of goods crossing borders within North America, and phased-in tariff reductions and special rules for agricultural, automotive, and textile and apparel products. It provided North American businesses with better access to materials, technologies, investment capital, and talent available across North America. Today's businesses in Canada, the U.S. and Mexico are much more interdependent than twenty-two years ago, through supply chains and cooperation.

[2] https://www.whitehouse.gov/trade-deals-working-all-americans

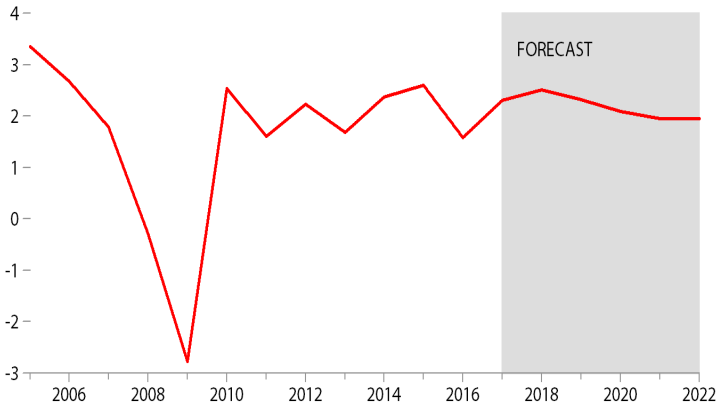
[3] Bureau of Economic Analysis, U.S. Department of Commerce: seasonally adjusted export/import data by geography. Quarterly data; last updated Dec 6, 2016

United States

- With the approval of the Keystonne XL oil pipeline in 2017, Canada now has the opportunity to get its product to refineries in the U.S. This would enable Alberta to sell its product on international markets and receive the benefit of international prices.
- U.S. real gross domestic product is expected to grow at 2.3 per cent in 2017, 2.5 per cent in 2018, and average annually 2.1 per cent per annum between 2019 and 2022. However, if promises to boost the rate of growth by the President materialize, we should see stronger growth numbers in gross domestic product and consumer spending.
- The consumer price index is expected to grow at 2.3 per cent in 2017, 2.7 per cent in 2018,and average 2.4 per cent annually for the rest of the forecast period.
- Unemployment is expected to fall from 4.9 per cent in 2016 to 4.8 per cent in 2017 and 4.7 in 2018. Without any further slack to exploit in the labor market we expect unemployment to rise, averaging 5.0 per cent per year between 2019 and 2022.
- Canada should expect to see strong growth in imports of goods and services around 7.2 per cent in 2017, backed by a stronger U.S. currency, and subsequent decreases averaging about 4.8 per cent annually for the rest of the forecast period. Exports are expected to grow at 5.9 per cent in 2017, 6.4 per cent in 2018, and average 4.7 per cent annually for the rest of the forecast period.

U.S. Gross Domestic Product

(2006 - 2016, Forecast 2017 - 2022; constant prices, per cent)

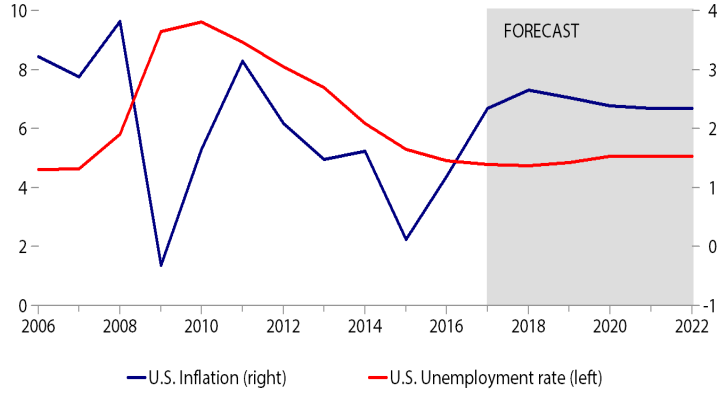


Source: IMF, Corporate Economics

Author: Corporate Economics

U.S. Unemployment and Inflation Rate

(2006 - 2016, Forecast 2017 - 2022; per cent)

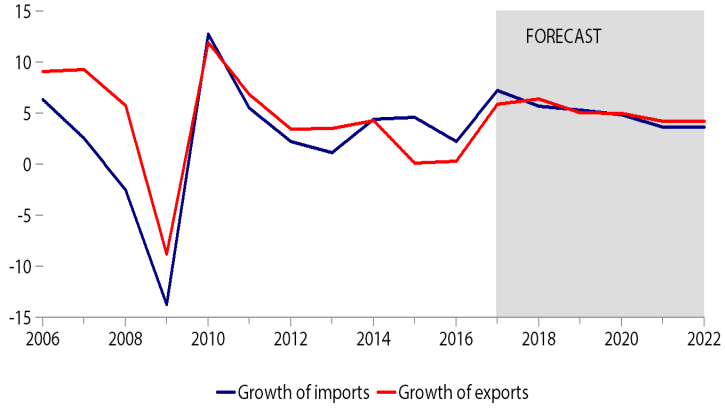


Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

U.S. Import and Export of Goods and Services

(2006 - 2016, Forecast 2017 - 2022; per cent)



Source: Statistics Canada, Corporate Economics

Author: Corporate Economics

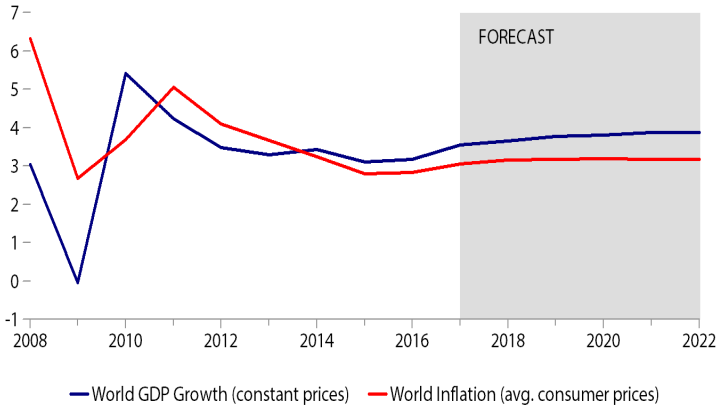
World

Labour Market and Consumption

- The effect of globalization a few years back propelled Brazil, Russia, India, China and South Africa as the new "rising stars", however, the required structural reforms necessary to aide and sustain these emerging markets have not followed. So, it remains to be seen what reforms are embraced to further chart a sustained growth path for these economies. By and large world growth is still expected to be driven by developing and emerging markets as industrialized countries face the prospects of tighter efficiency gains, aging labor forces and higher skilled labor requirements.
- World gross domestic product is expected grow by 3.5 per cent in 2017, followed by an increase of 3.6 per cent in 2018, and an average annual growth of 3.8 per cent per year for the rest of the forecast period.
- Inflation in 2017 is expected to be stronger than 2016, projected at 3.0 per cent, and increase to 3.1 per cent in 2018. Demand pressure is expected to push inflation growth and average 3.2 per cent per year for the remainder of the forecast period.
- We expect investment as a percent of world gross domestic product to continue to increase within the forecast period as a driver of economic growth.

World GDP Growth and Inlation

(2008 - 2016, Forecast 2017 - 2022; per cent)

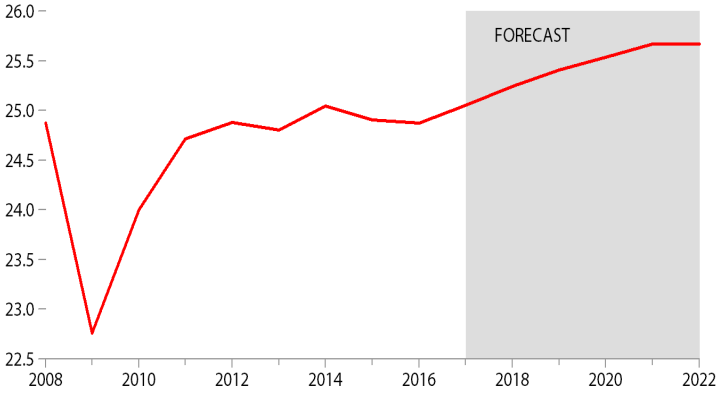


Source: IMF, Corporate Economics

Author: Corporate Economics

World Investment as a Percent of GDP

(2008 - 2016, Forecast 2017 - 2022, per cent)



Source: IMF, Corporate Economics

Author: Corporate Economics

Appendices

Forecast Tables

Table 1 Selected Economic Indicators

Rest of the World, United States, Canada, Alberta, Calgary Economic Region & Calgary

						FORECAST					
Forecast completed March 2017	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ASSUMPTIONS											
Global Economy											
World Real Gross Domestic Product Growth (%)	3.5	3.3	3.4	3.1	3.2	3.5	3.6	3.8	3.8	3.9	3.9
The United States											
U.S. Real Gross Domestic Product Growth (%) (chained 2009 dollar)	2.2	1.7	2.4	2.6	1.6	2.3	2.5	2.3	2.1	2.0	2.0
Canada											
Canada Real Gross Domestic Product Growth (%) (chained 2007 dollar)	1.7	2.5	2.6	0.9	1.3	2.0	2.0	1.7	1.7	1.8	1.5
Prime Business Loan Rate (%)	3.0	3.0	3.0	2.8	2.7	2.5	2.7	3.4	4.1	4.6	5.1
Exchange Rate (US$/Cdn$)	1.00	0.97	0.91	0.78	0.75	0.74	0.76	0.79	0.80	0.82	0.84
Alberta											
Alberta Real Gross Domestic Product Growth (%) (chained 2007 dollar)	3.9	5.7	5.0	-3.6	-2.7	2.4	2.3	2.4	2.7	2.8	2.5
Total Employment Growth (%)	3.5	2.5	2.2	1.2	-1.6	0.6	1.1	1.6	1.8	1.6	1.5
Unemployment Rate (%)	4.6	4.6	4.7	6.0	8.1	8.3	7.7	7.0	6.5	6.3	6.2
Housing Starts ('000 Units)	33.4	36.0	40.6	37.3	23.6	24.5	26.1	29.1	30.5	31.4	31.6
Inflation Rate (%)	1.1	1.4	2.6	1.2	1.1	2.1	2.0	1.9	2.3	2.3	2.3
West Texas Intermediate - WTI (US$/bbl)	94.1	97.9	93.3	48.7	42.6	51.1	54.8	57.8	60.5	62.4	72.5
Western Canadian Select - WCS (US$/bbl)	71.8	73.6	74.5	35.7	29.5	41.5	44.9	49.5	53.8	57.8	61.9
Alberta Natural Gas Price - AECO/NIT (C$/GJ)	2.3	3.0	4.3	2.6	2.1	3.0	3.1	3.2	3.4	3.6	3.8
Industrial Product Price Index (%)	1.1	0.4	2.5	-0.8	-0.4	1.9	1.9	2.1	2.0	1.9	1.9
Raw Materials Price Index (%)	-4.1	0.9	1.6	-19.9	-4.7	10.3	3.1	5.0	3.3	3.1	3.1
Alberta Average Wage Rate Increase for all industries (%)	5.7	4.9	4.5	-2.1	-1.7	1.4	2.3	2.3	2.7	2.7	2.7
FORECAST											
Calgary Economic Region (CER)											
Real Gross Domestic Product Growth (%)*	6.0	6.5	4.6	-3.7	-1.1	1.9	2.3	2.6	2.7	2.7	2.4
Total Employment ('000 persons)	814	838	857	878	859	870	885	910	934	954	970
Total Employment Growth (%)	4.9	2.9	2.3	2.5	-2.2	1.3	1.7	2.8	2.6	2.1	1.7
Unemployment Rate ('%) (CER)	4.8	4.8	4.9	6.3	9.0	8.5	7.5	6.6	6.1	6	6.1
Inflation Rate (%) (CMA)	1.0	1.7	3.0	1.3	1.0	1.8	2.0	2.3	2.2	2.3	2.2
Building Permints ($billions)	5.6	7.5	7.7	7.5	5.7	3.8	4.0	5.4	5.6	6.1	6.7
Low Forecast	N/A	N/A	N/A	N/A	N/A	3.2	3.4	4.8	5.0	5.5	6.1
High Forecast	N/A	N/A	N/A	N/A	N/A	4.4	4.6	6.0	6.2	6.7	7.3
Housing Starts ('000 units) (CMA)	12.8	12.6	17.1	13	9.4	9.6	11.6	14.1	14.7	15.8	15.4
Non-Residential Building Price Inflation (%) (CMA)	3.7	1.2	1.3	-0.6	-2.7	3.0	2.4	3.3	3.9	2.8	2.7

Numbers may not add up due to rounding
* Source: Centre for Spatial Economics, Corporate Economics, International Monetary Fund
Total population, census divisions and census metropolitan areas, 2001 Census boundaries
Canada GDP (CANSIM380-0017)

Table 2 Selected Indicators for the City of Calgary

Forecast completed March 2017

						FORECAST					
Forecast completed March 2017	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Demography											
Total Population ('000 Persons)	1,120	1,157	1,195	1,231	1,235	1,247	1,259	1,274	1,292	1,313	1,345
Total Population Growth (%)	2.7	3.3	3.3	3.0	0.3	1.0	0.9	1.2	1.4	1.7	2.4
Net Migration ('000 Persons)	19.7	26.2	28.0	24.9	-6.5	1.6	1.5	5.6	8.1	12.5	22.7
Household Formation ('000 Units)	8.1	12.2	8.1	11.1	1.2	4.6	4.3	5.7	6.5	8.0	11.8
Real Estate											
Residential Market											
Housing Starts ('000 units)	10.3	9.4	13.8	10.7	7.8	7.6	8.5	8.7	9.4	9.4	9.4
Housing Completions ('000 units)	8.4	9.0	9.9	14.4	6.6	7.8	7.6	8.5	8.7	9.4	9.4
Average Residential MLS® Price Change (%)*	2.2	6.3	5.3	-1.7	2.3	2.5	-0.5	0.8	6.2	4.0	5.0
Total Building Permits mid point ($billion)	4.4	6.1	6.3	6.3	4.7	3.1	3.3	4.4	4.6	5.0	5.5
Low Forecast						2.6	2.8	3.9	4.1	4.5	5.0
High Forecast						3.6	3.8	4.9	5.1	5.5	6.0
Office Space Market											
Calgary Office Vacancy Rate	6.3	6.4	6.9	10.4	17.6	20.0	22.0	18.0	16.0	14.0	14.0
Other											
Transit Adult Ridership (millions trips)	61.7	68.4	69.9	68.4	61.9	60.7	61.4	62.5	64.2	65.5	66.3

* Source: CREA, Corporate Economics

Table 3 Selected Comodity Price Inflation

(Year-over-year per cent change)

						FORECAST					
Forecast completed March 2017	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Commodities											
Construction Commodities											
Iron and steel products	-1.3	-1.1	3.1	5.3	2.6	8.6	11.0	1.1	7.4	0.3	0.3
Aluminium products	-9.5	2.4	6.6	7.0	-8.7	1.6	5.4	-8.4	3.5	7.7	8.1
Wood	2.1	6.9	3.2	1.6	3.9	1.6	1.5	-1.3	0.5	0.6	-0.9
Asphalt*	13.6	-5.4	14.5	-9.6	-25.4	16.0	4.4	-3.9	-3.2	-3.8	0.1
Operational Commodities											
Rubber	-27.5	-14.3	-24.6	-7.9	6.4	16.7	10.4	2.4	3.9	3.0	2.5
Diesel Oil	-0.5	5.2	7.9	-21.8	-10.2	6.2	6.1	10.7	13.5	9.8	12.1
Vehicle Parts	2.6	0.1	0.9	2.1	1.3	-2.0	1.2	2.0	2.9	3.1	2.3

* Based on Ontario Ministry of Transportation Asphalt Price Index

Numbers may not add up due to rounding

Table 4 City of Calgary Population Projections

City of Calgary	Persons	FORECAST						
Forecast completed Sept. 2016	2016	2017	2018	2019	2020	2021	2022	2023
Total Population (as of April)	1,235,200	1,247,400	1,259,100	1,274,400	1,291,700	1,313,200	1,344,800	1,372,400
Total Population Growth Rate (April - March, %)	0.3	1.0	0.9	1.2	1.4	1.7	2.4	2.0
Total Net Migration (April - March)	-6,500	1,600	1,500	5,600	8,100	12,500	22,700	18,300
Total Births (April - March)	17,600	17,800	17,500	17,200	17,000	16,900	17,000	17,500
Total Deaths (April - March)	6,800	7,100	7,300	7,500	7,700	7,900	8,100	8,200
Total Natural Increase (April - March)	10,800	10,700	10,200	9,700	9,300	9,000	8,900	9,300
Total Households (as of April)	465,800	470,400	474,700	480,400	486,900	494,800	506,700	517,500
Total Household Formation (April - March)	1,200	4,600	4,300	5,700	6,500	8,000	11,800	10,800
Population by 5-Year Cohort								
0-4	85,600	86,500	87,200	87,200	86,800	85,900	85,000	84,900
5-9	77,900	80,300	81,900	83,000	84,000	85,400	86,100	86,800
10-14	67,700	68,900	70,900	73,500	76,100	78,300	81,100	82,800
15-19	66,800	66,000	65,500	65,900	66,900	68,700	70,700	73,300
20-24	77,400	74,300	71,900	71,100	70,900	71,800	74,700	76,300
25-29	100,500	97,000	92,900	90,000	87,800	86,500	90,100	92,400
30-34	112,000	111,700	110,500	108,900	107,500	107,500	109,400	110,100
35-39	108,200	109,800	111,200	113,600	116,000	117,900	122,300	124,800
40-44	98,600	99,500	101,000	103,500	107,100	111,800	116,400	120,700
45-49	84,900	87,900	91,200	94,000	96,600	99,500	101,700	104,600
50-54	86,200	85,700	84,700	83,900	83,800	84,600	88,200	92,100
55-59	77,800	79,700	81,000	82,100	82,800	82,500	80,600	79,100
60-64	60,100	63,700	67,400	70,100	72,100	73,200	73,500	73,400
65-69	47,700	49,800	50,500	51,900	53,900	56,400	59,200	62,100
70-74	30,600	32,300	35,300	38,200	40,800	43,300	44,800	45,200
75-79	21,000	21,800	22,700	23,900	25,000	26,300	27,400	29,700
80-84	16,000	16,100	16,200	16,200	16,400	16,400	16,900	17,500
85-89	10,500	10,700	10,700	10,700	10,600	10,400	10,300	10,200
90-99	5,400	5,800	6,100	6,300	6,500	6,600	6,400	6,200
99+	200	200	200	200	200	200	200	300
Total:	**1,235,200**	**1,247,400**	**1,259,100**	**1,274,400**	**1,291,700**	**1,313,200**	**1,344,800**	**1,372,400**
Youth (12 - 18)	78,900	79,400	80,600	82,400	84,400	87,700	91,200	94,100
Primary School Age 6 - 17	168,500	171,500	175,300	179,400	183,400	188,000	193,000	197,300
Working Age 15 - 64	872,600	875,400	877,500	883,300	891,500	904,000	927,500	946,800
Seniors 65+	131,400	136,500	141,700	147,400	153,300	159,600	165,100	171,100
Super Seniors 85+	16,100	16,600	17,000	17,200	17,300	17,200	16,900	16,700
Female Super Seniors 85+	10,200	10,500	10,700	10,800	10,800	10,800	10,600	10,500
Numbers may not add up due to rounding								

Table 5 Calgary Economic Region Population Projections

Calgary Economic Region	Persons	FORECAST						
Forecast completed September 2016	2016	2017	2018	2019	2020	2021	2022	2023
Total Population (as of April)	1,554,200	1,569,500	1,583,300	1,603,100	1,628,700	1,657,500	1,692,000	1,728,500
Total Population Growth Rate (April - March) (%)	0.4	1.0	0.9	1.3	1.6	1.8	2.1	2.2
Total Net Migration (April - March)	-7,100	2,300	1,600	8,200	14,700	18,500	24,600	27,000
Total Births (April - March)	21,600	21,800	21,400	21,000	20,700	20,600	20,600	20,700
Total Deaths (April - March)	8,600	8,800	9,200	9,500	9,800	10,300	10,700	11,200
Total Natural Increase (April - March)	13,000	12,900	12,300	11,500	10,900	10,400	9,900	9,500
Total Households (as of April)	597,800	603,600	609,000	616,600	626,400	637,500	650,800	664,800
Total Household Formation (April - March)	2,300	5,900	5,300	7,600	9,800	11,100	13,300	14,000
Population by 5-Year Cohort								
0-4	108,000	108,700	109,000	108,700	107,800	106,400	105,700	105,400
5-9	98,500	100,900	102,700	104,000	105,600	108,100	109,100	109,700
10-14	87,500	89,100	91,500	94,800	98,200	101,000	104,500	107,400
15-19	88,100	86,900	85,900	86,300	88,200	90,900	94,100	98,400
20-24	99,000	96,600	94,300	93,300	93,600	94,600	96,400	98,500
25-29	120,200	116,000	111,900	109,500	107,900	107,100	108,800	111,000
30-34	135,900	135,200	133,000	130,200	128,000	126,500	125,700	125,700
35-39	134,200	135,300	136,300	138,000	139,700	140,300	142,200	143,000
40-44	123,800	124,600	126,100	128,800	132,400	136,900	139,800	143,000
45-49	107,600	111,700	115,600	118,700	121,700	124,900	126,700	129,600
50-54	109,100	107,900	106,600	105,800	105,900	107,300	111,900	116,500
55-59	99,000	101,600	103,400	105,300	106,800	107,300	106,400	105,500
60-64	76,800	81,500	86,200	90,000	93,400	96,200	98,800	100,800
65-69	61,300	64,100	65,000	66,900	70,100	73,500	78,100	82,900
70-74	39,600	42,000	46,100	49,900	53,300	57,000	59,700	60,900
75-79	26,300	27,600	28,900	30,800	33,000	35,200	37,400	41,300
80-84	19,800	19,900	20,100	20,300	20,800	21,400	22,700	23,900
85-89	12,700	12,900	13,100	13,300	13,400	13,600	13,800	14,100
90-99	6,500	7,100	7,500	8,100	8,700	9,300	9,900	10,500
99+	200	200	200	200	300	300	400	500
Total:	**1,554,200**	**1,569,500**	**1,583,300**	**1,603,100**	**1,628,700**	**1,657,500**	**1,692,000**	**1,728,500**

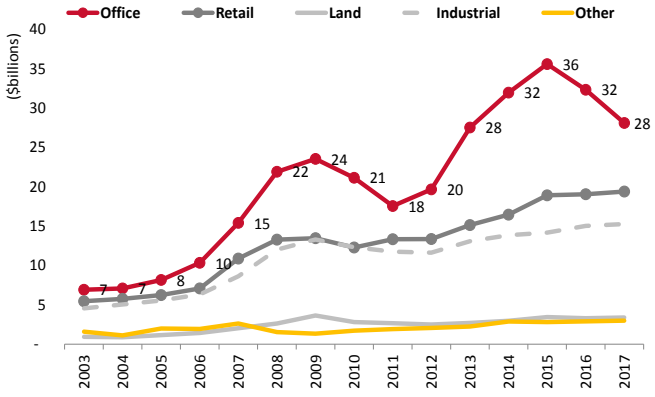
Numbers may not add up due to rounding

Calgary Assessment Analysis

Non-residential Market

Taxable Assessment Values

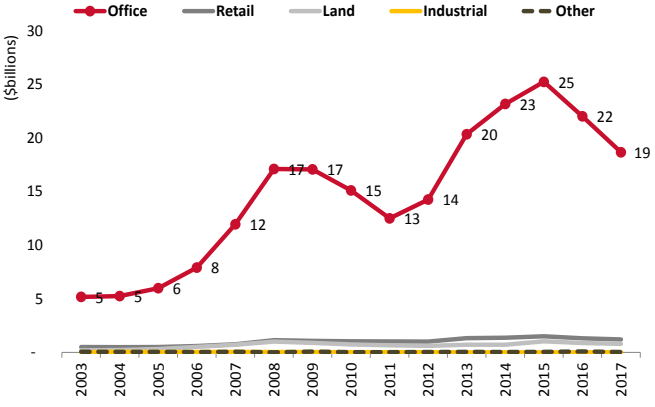
Non-residential Taxable Assessment Values: City-wide
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

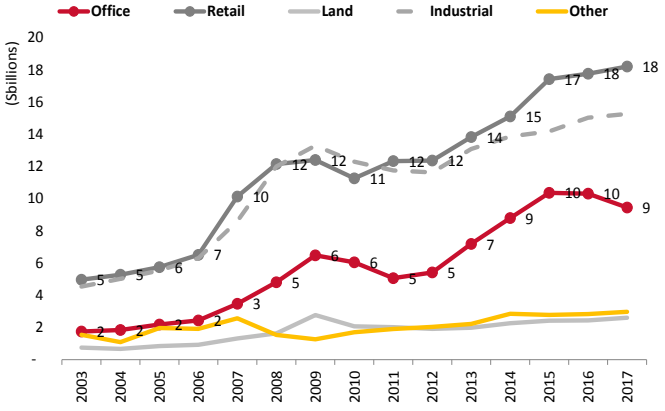
Non-residential Taxable Assessment Values: Downtown
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Non-residential Taxable Assessment Values: Excluding Downtown
(2003 - 2017)

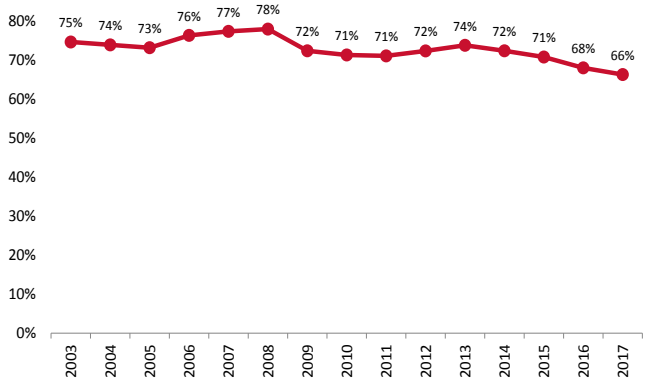


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Share of Taxes: Downtown vs. City-wide

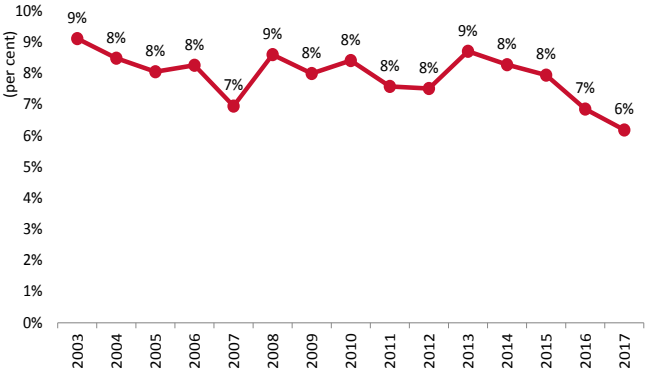
Taxable Office Assessment Value: Downtown /City-wide
(2003 - 2017; per cent)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

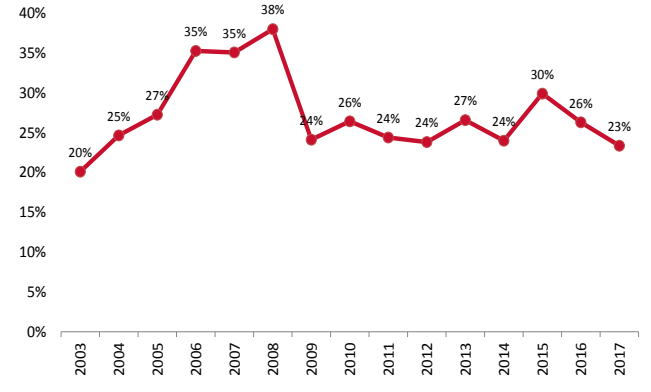
Taxable Retail Assessment Value: Downtown/City-wide
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Taxable Land Assessment Value: Downtown/ City-wide
(2003 - 2017)



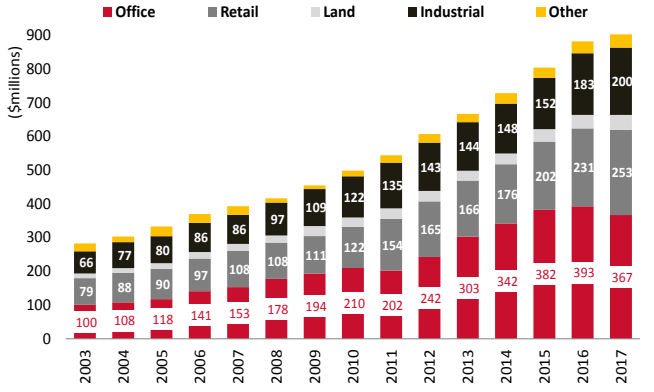
Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Tax Revenue by Property Type

Non-residential Property Tax Revenues: Calgary City-wide

(2003 - 2017)

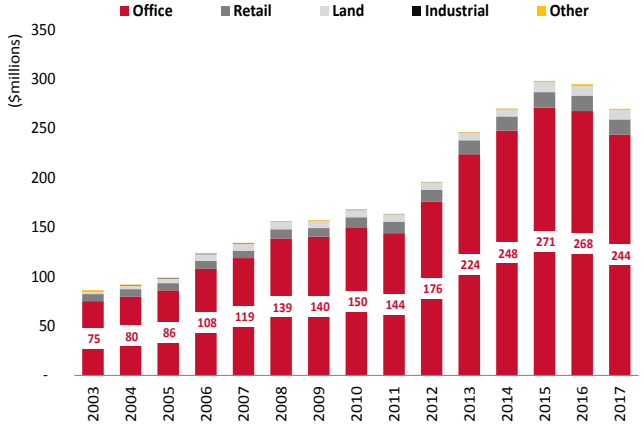


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Non-residential Property Tax Revenues: Downtown

(2003 - 2017)

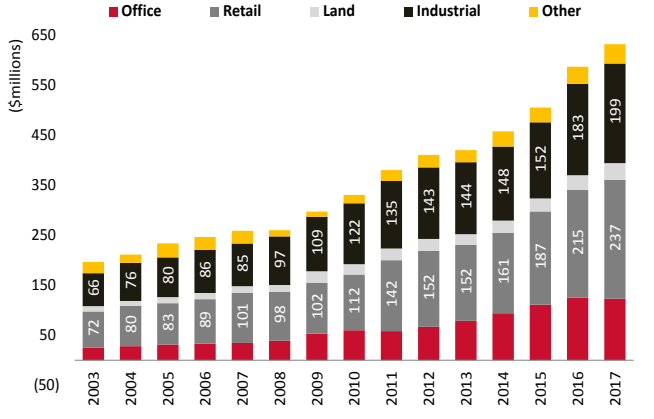


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Non-residential Property Tax Revenues: Excluding Downtown

(2003 - 2017)



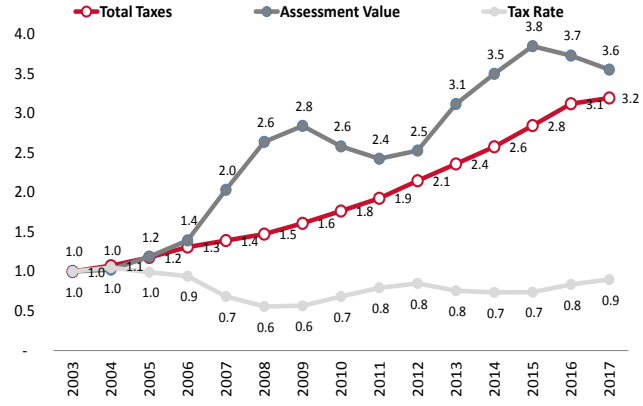
Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Accumulated Growth: Taxable Assessment Value, Tax Rate, and Tax Revenue

Non-residential Market Growth: City-wide

(Index 2003=1)

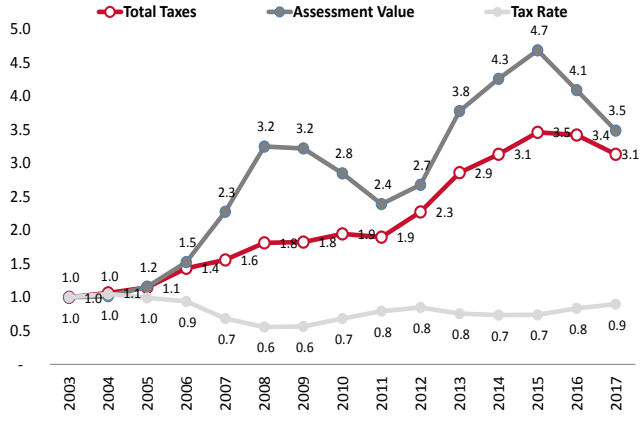


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Non-residential Market Growth: Downtown

(2003 - 2017; Index 2003=1)

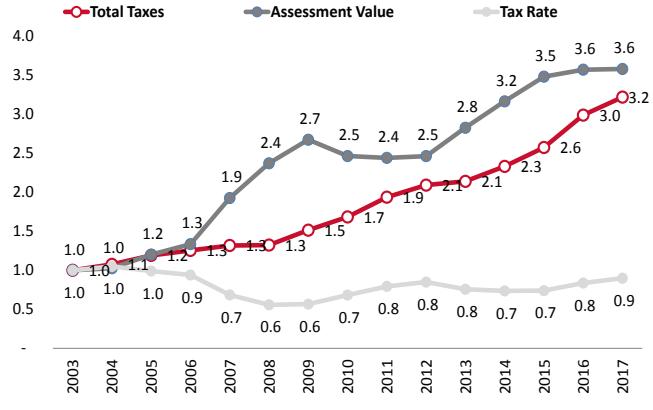


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Non-residential Market Growth: Excluding Downtown

(Index 2003=1)



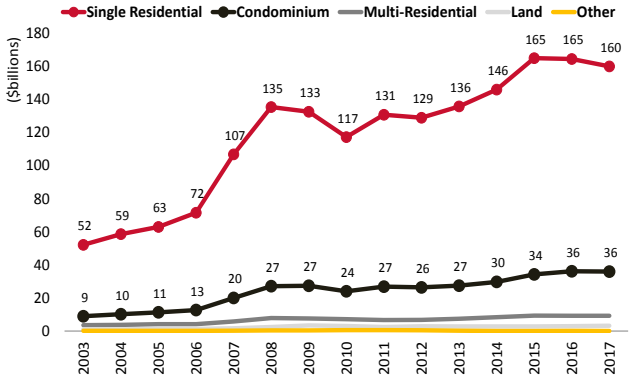
Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Residential Market

Taxable Assessment Values

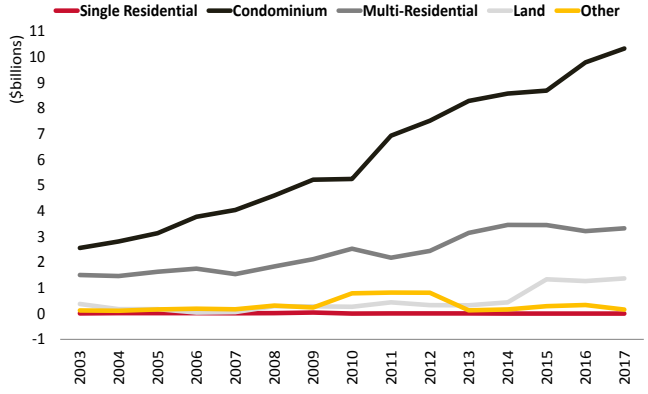
Residential Taxable Assessment Values: Calgary City-wide
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

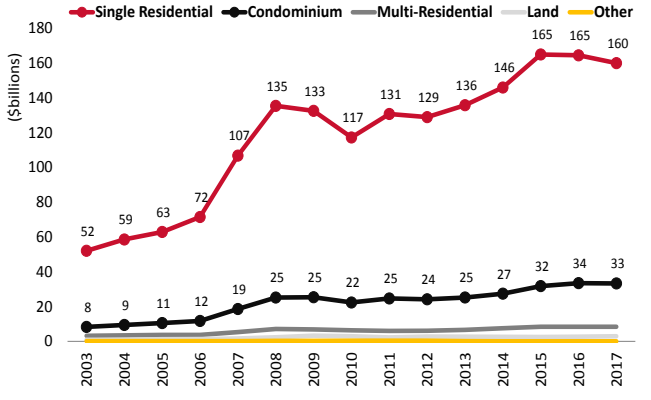
Residential Taxable Assessment Values: Downtown
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Residential Taxable Assessment Values: Excluding Downtown
(2003 - 2017)

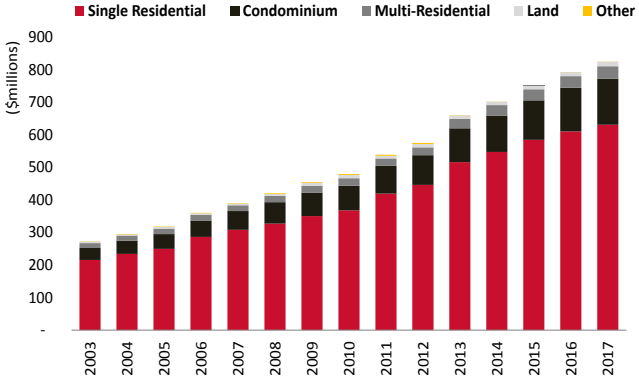


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Tax Revenue by Property Type

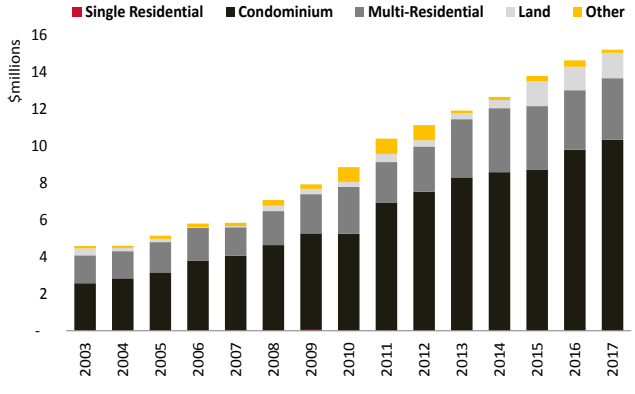
Residential Property Tax Revenues: Calgary City-wide
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

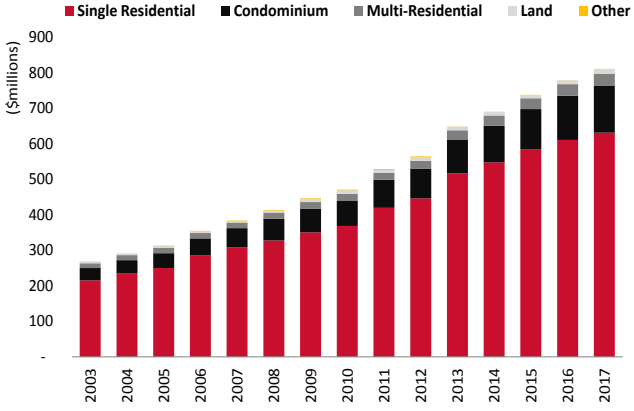
Residential Property Tax Revenues: Downtown
(2003 - 2017)



Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Residential Property Tax Revenues: Excluding Downtown
(2003 - 2017)



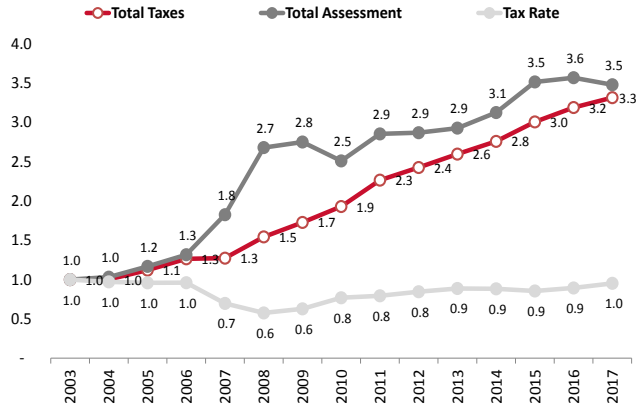
Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Accumulated Growth:Taxable Assessment Value, Tax Rate, and Tax Revenue

Residential Market Growth: City-wide

(Index 2003=1)

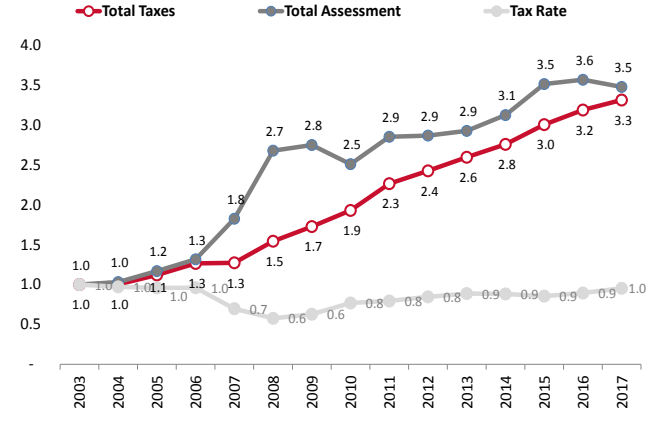


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Residential Market Growth: Downtown

(Index 2003=1)

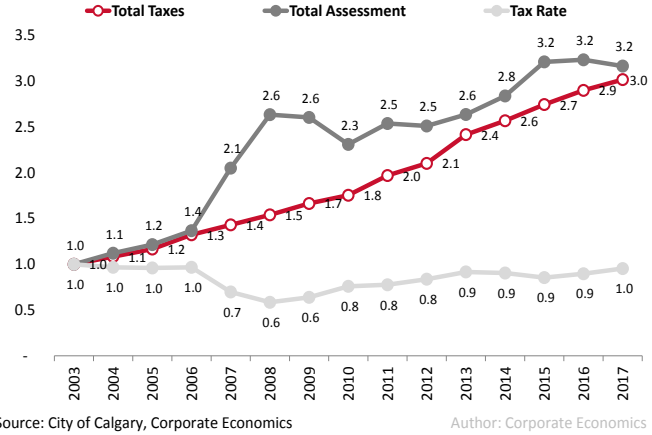


Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Residential Market Growth: Excluding Downtown

(Index 2003=1)



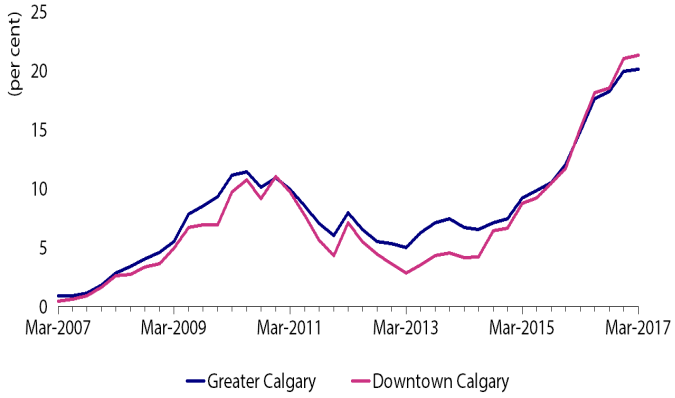
Source: City of Calgary, Corporate Economics

Author: Corporate Economics

Calgary Office Market Dynamics

Calgary Office Vacancy Rates

(Mar. 2008 - Mar. 2017)

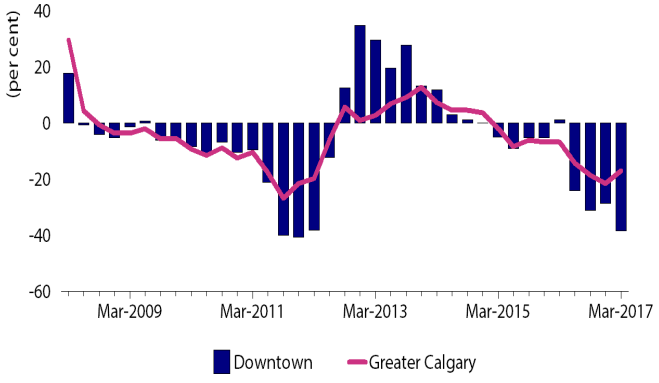


Source: Altus InSite, Corporate Economics

Author: Corporate Economics

Calgary Rental Inflation Rate

(Mar. 2008 - Mar. 2017)

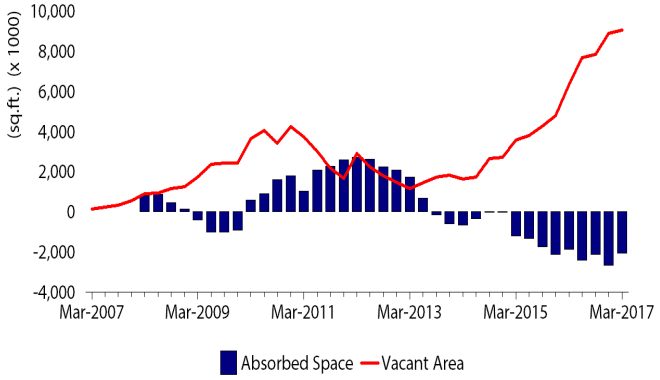


Source: Altus InSite, Corporate Economics

Author: Corporate Economics

Downtown Office Market

(Mar. 2008 - Mar. 2017)

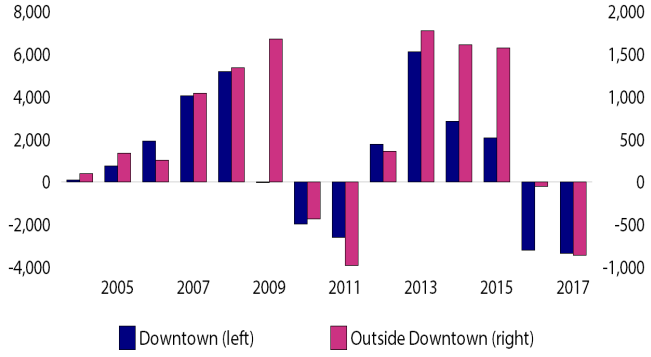


Source: Altus InSite, Corporate Economics

Author: Corporate Economics

Calgary: Changes in Office Assessed Values

(2005 - 2017; $millions)

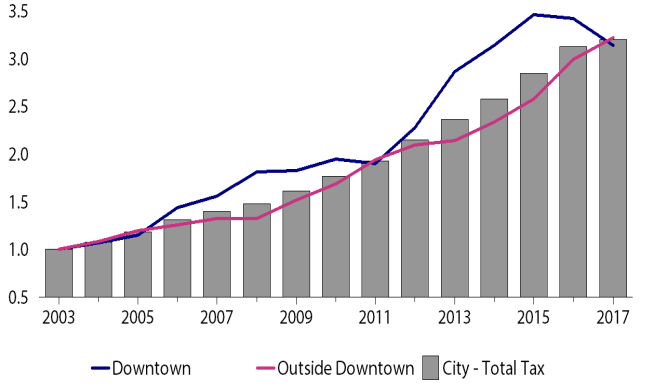


Source: Assessment BU

Author: Corporate Economics

Calgary: Cumulative Growth in Non-residential Property Taxes

(2003 - 2017; Index 2003=1)



Source: Assessment BU

Author: Corporate Economics

Glossary

AECO C

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

Account surplus

Occurs when a nation's total exports of goods, services and transfers exceed its total imports of these items.

Advanced economies

Currently composed of 31 developed countries: Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan Province of China, United Kingdom and the United States.

Aggregate demand

The sum of consumer, government and business spending and net exports.

Baltic Dry Index (BDI)

The Baltic Dry Index (BDI) is a popular financial barometer to track worldwide international shipping prices of various dry bulk cargoes. It is a number issued daily by the London-based Baltic Exchange. The index provides an assessment of the price of moving the major raw materials by sea.

Baby-Boomer Generation (BBG)

Those born between January 1st 1946 and December 31st 1964.

Calgary Economic Region (CER)

See Economic region.

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

Goods usually produced and/or sold by many different companies. It 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, 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.

Core inflation rate

Rate of inflation in the Consumer Price Index excluding food and energy.

Defined benefit plan (DB)

A defined benefit plan provides a retiree with a pre-determined percentage of his/her working salary when he/her retires.

Defined contribution plan (DC)

A defined contribution plan (DC) provides with a pension benefit based on the accumulated contributions from both an employee and his/her employer and investment income by the pension administrator.

Dependency ratio

The ratio of the sum of the population under 15 years and over 64 years divided by the working age population (15 years to 64 years).

Economic region

The area generally correspondent to a region used by the province for administrative and statistical purposes.

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 persons expressed as a percentage of the working age population.

Euro zone

Denomination given to the European Union members that adopt the Euro as their currency. As of 2007 there were 15 countries in the Euro Area: Belgium, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, The Netherlands, Austria, Portugal, Slovenia and Finland.

European Union (EU)

Composed of 28 countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Romania, and United Kingdom.

Eurostat (Statistical Office of the EU)

It produces data for the European Union and promotes harmonization of statistical methods across the member states of the European Union.

Emerging economies

This is a reference to countries that, due to growth performance, are considered in transition between developing and developed countries. The most important emerging economies are Brazil, China, India and Russia, sometimes referred to as BRIC.

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.

Fixed exchange rate

Sometimes called a pegged exchange rate, is a type of exchange rate regime wherein a currency's value is matched to the value of another single currency or to a basket of other currencies, or to another measure of value, such as gold.

Goods-producing industry

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.

Home market value

An indicator to compare houses across the country. This indicator is based on an 1,800 sq. ft., seven-room, three-bedroom, two-bath home in a suburban community where middle income Canadian families of four reside.

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.

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.

Inflation rate

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

In-migrants

Persons currently living within a census metropolitan area (CMA), that five years earlier lived elsewhere in Canada or abroad.

Labour force

The working age population, which includes employed and unemployed people.

Labour force participation rate

The participation rate refers to the number of people who are either employed or are actively looking for work. It is the ratio between the labour force and the working age population.

Major advanced economies (G7)

Composed of seven countries: Canada, France, Germany, Italy, Japan, United Kingdom, and the United States

Migrants

Persons who lived in a different census subdivision (CSD) than the one they lived in five years earlier (internal migrants) or who lived outside Canada (external migrants or immigrants).

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.

Non-accelerating inflation rate of unemployment (NAIRU)

This is the rate of unemployment consistent with an economy that is growing at its long-term potential so there is no upward or downward pressure on inflation. It changes over time primarily because of demographic shifts and technological advancements.

OECD

It is the acronym for Organization of Economic Cooperation and Development. It currently has 30 members, all from developed economies in Europe, North America, Asia and Oceania. It was created in 1961 and aims to foster prosperity and fight poverty through economic growth and financial stability.

OPEC

Organization of Petroleum Exporting Countries. It has 12 country members; Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

Old age dependency ratio

The ratio of the population over 64 years divided by the working age population (15 years to 64 years).

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.

Who We Are

Patrick Walters
City Economist
Tel: 403.268.1335 or **patrick.walters@calgary.ca**

Patrick Walters has an interest in applying quantitative methods to solve operational questions. He is experienced in building forecasting and simulation models and has presented to professional bodies such as the System Dynamics Society.

Before joining The City of Calgary, he served as Senior Economist and Economist with The City of Edmonton, the Alberta Government and Environment Canada. Patrick earned a Master's degree in Economics from York University with specializations in Labor Economics, Industrial Relations and International Economics. He has a bachelor's degree from the University of Toronto.

Clyde Pawluk
Senior Corporate Economist
Tel: 403.268.2643 or **clyde.pawluk@calgary.ca**

Clyde completed 20 years with the City of Calgary in 2016. Over that time he has worked in several business units on a multitude of projects. Clyde has a B.A. in Economics (1992), M.A. in Economics (1995), a LL.B. (2003) and was called to the Alberta Bar in 2004. When he is away from his desk you might find him hiking, skiing or riding his motorbike.

Ivy Zhang
Senior Corporate Economist
Tel: 403.268.2005 or **ivy.zhang@calgary.ca**

Ivy joined The City as an economist in 2005, after working as an engineer and then a marketing manager in Beijing. She specializes in municipal finance, forecasting, energy market analysis, and labour economics. Ivy's report "A Case of Fiscal Imbalance: The Calgary Experience" studied the fiscal imbalance between the local government and the provincial or federal government. In 2011, she presented her findings at the Fiscal Issues Session of the 45th Annual Conference of the Canadian Economic Association in Ottawa. Ivy has a B.Sc. in physics, a MBA in marketing, and a M.A. in Economics.

Wendy Fan
Senior Corporate Economist
Tel: 403.268.2021 or **wfan@calgary.ca**

Wendy currently focuses on financial and public policy analysis, economic modelling and consulting, and econometric and statistical analysis. Wendy has provided analytical assistance to various City busi-

ness units including the City Manager's Office, Law Department, Community Services, Corporate Financial Reporting and many other business units, as well as external stakeholders such as Calgary Economic Development and Calgary Parking Authority. Wendy also provides monthly economic monitoring reports of Calgary and Alberta's economy. Wendy has a B.A. in Insurance and Actuarial Science, M.A. in Economics, and studied in the Ph.D. program in Economics.

Dr. Chukwudi Osuji, Ph.D.
Senior Corporate Economist
Tel: 403.268.3752 or **chukwudi.osuji@calgary.ca**

Chukwudi's current areas of interest include urban and regional planning, econometric modeling, non-parametric and wavelet applications, and public policy. Chukwudi started lecturing in 1992 in Statistics and Econometrics, while completing his master's program in Economics at the University of Windsor, Ontario in 1993. He started his Ph.D. at University of Western Ontario and completed it at Wayne State University in Detroit Michigan in 2001. He was a visiting lecturer at University of Michigan-Dearborn, an adjunct professor at Lawrence Technological University in Southfield Michigan, lectured at Wayne State University in Detroit Michigan and Imo State University, Imo State Nigeria, and worked as an Econometrician for Power Information Network an affiliate of JD Powers and Associates in Troy Michigan. Chukwudi holds a B.Sc. degree with a major in Physics (1991) from University of Windsor. Chukwudi enjoys spending lots of time with his four children, and working on his automobiles whenever he is chanced.

Jorjeta Bojanova
Corporate Research Analyst
Tel. 403.268.5556 or **jorjeta.bojanova@calgary.ca**

Jorjeta's is interested in data management and analysis and is involved in several research projects and reports while managing the databases for the team. Her interest in macroeconomics is closely linked to her background. Jorjeta holds a B.A. and M.A. in Political Science from Free University Berlin and studied in the Ph.D. program there with specialization on EU and it's primary law. Jorjeta holds also a Master's degree in German Linguistics from State University Sofia and received the German DAAD scholarship in Psycholinguistics. Priorly, Jorjeta worked as professor, researcher, parliamentarian assistant and analyst for both the government and the business. Just as she is passionate about her work, so she is about arts and fencing.

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.

For more information, please contact us:

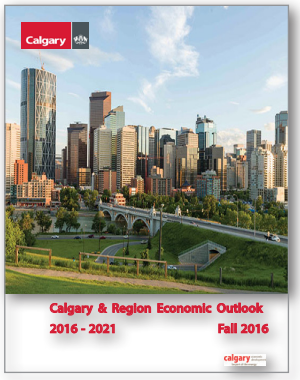
Patrick Walters
403.268.1335
patrick.walters@calgary.ca

Ivy Zhang
403.268.2005
ivy.zhang@calgary.ca

Jorjeta Bojanova
403.268.5556
jorjeta.bojanova@calgary.ca

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

Forecast



- Calgary & Region Economic Outlook
- Energy Reports on Natural Gas and Crude Oil

Information Provision

- Labour Market Review
- Inflation Review
- Current Economic Analysis
- Housing Review

Policy Analysis

- A Case of Fiscal Imbalance: The Calgary Experience
- Diesel Fuel Price Pass-Through Calgary
- Calgary Residential and Commercial Real Estate Market

Sources:
Statistics Canada, CMHC, CREB, MLS, Bank of Canada, Conference Board of Canada, GLJ Energy Publications, The City of Calgary, Centre for Spatial Economics (C4SE), IHS Global Insight, U.S. Federal Bank Reserve of St. Louis, International Money Fund (World Economy Outlook), World Bank, Central Plan Bureau Netherlands, and others.