CHEMISTRY INDUSTRY ASSOCIATION OF CANADA

2023 Economic Outlook for Industrial Chemicals

February 24, 2023

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2023 YEAR IN REVIEW FOR CANADIAN INDUSTRIAL CHEMICALS

2022 was a year of recovery and demand normalization across Canada's Industrial Chemicals sector buttressed by a surge in energy and feedstock costs owing to the war in Ukraine, COVID lockdowns in China and a very uneven COVID recovery in Asia. These factors led to a surge in product pricing for many Industrial Chemicals but also led to demand slowdowns across the world and further pressure on supply chains that had yet to fully recover, especially in downstream manufacturing. As a partial consequence, inflation levels which had begun rising in 2021, reached multi-decade highs in 2022, across rich, middle and emerging economies. As a response Central Banks, ex-China and Japan, embarked on a synchronized monetary policy tightening cycle with interest rates climbing at their fastest pace in decades. These events caused both demand and supply convulsions in Industrial Chemicals that saw demand for some products drop, others to increase and some simply to return to pre-COVID trends as their downstream customers recovered. Throughout these waves, Canada's Industrial Chemical output remained strong.

2022 saw a record $30.8 billion in shipments, 11.2% ahead of 2021 levels. Exports end 2022 also at a record high of $24.8 billion, 11.5% higher than the previous record set in 2021. 2022 was an exceptionally strong year for Petrochemical, Industrial Gas, Inorganic and Organic Chemical producers. All these sub-sectors saw record levels of shipments in 2022. 2022 did see a normalization for Resin, Synthetic Fibre and Rubber shipments with estimates for 2022 levels to decline by 9.2% to $10.3 billion. The 2022 total is the second highest year of Resin, Synthetic Fibre and Rubber shipments behind 2021. Overall, Industrial chemical volumes ended 2022 near pre-COVID-19 levels and are expected to increase in 2023 as new capacity projects come online in Alberta and Ontario and as supply chains continue to recover.

Capital expenditures for 2022 were nearly flat with 2021 levels, with more regularized maintenance spending offsetting the decline in new capital expansion as major projects in Alberta and Ontario moved into production.

2022 Economic Year in Review Summary

- Shipments of Industrial Chemicals increased by 11% in 2022 from 2021 levels and end the year at a record high of $30.7 billion.
- Exports increased by 11.5% in 2022 on higher volumes and strong pricing, ending the year at a record of $24.8 billion.
- Canadian Industrial Chemicals have benefited from high global product prices, lower input costs, a relatively strong CAD/USD exchange rate and further recovery of demand in downstream sectors in North America and globally.
- Prices for many industrial chemicals have retreated from highs with significant differences between subsectors. Globally Industrial Chemical producers continue to match supply with demand.
- Energy and feedstock costs have moderated from Spring and Summer 2022 highs but remain volatile.
- The level of capital investment is expected to decrease as two major projects are entering operation.
- Total employment by the industry is projected to grow by 2% along long-term trends as new investments come online.

2023 OUTLOOK FOR CANADIAN INDUSTRIAL CHEMICALS

- Canada's Industrial Chemical sector is set to see shipment growth of 2-8% in 2023 as new investments reach full output and downstream sectors continue to normalize from pandemic disruptions.
- Exports are expected to increase by 2-8% in 2023.
- Product prices are volatile and may impact headline figures (Shipments and total Export figures) positively or negatively. The volumes of Industrial Chemicals shipped to customers is expected to grow as production increases with new investments.
- The recent decline in natural gas prices in early 2023 is a competitive advantage for Canada's Industrial Chemical sector if maintained.
- Transportation supply chains, especially Rail and Port flow, continue to improve and can act as a tailwind for product supply in 2023.
- The level of capital investment is expected to decrease as Canada's major expansion projects have completed construction.
- Total employment by the industry is projected to grow by 2% along long-term trends as new investments come online.

ECONOMIC FOCUS FOR INDUSTRIAL CHEMICALS IN 2023

DOWNSTREAM DEMAND AND NEW INVESTMENT PRODUCTION

Canada's Industrial Chemical sector enters 2023 in a very strong position. Shipments and exports are at record highs. Physical demand for resin and chemical products continued to recover through 2022 with all non-Resin Industrial Chemical sub-sectors seeing record levels of shipments and exports last year. However, domestic production strength was tempered by a slowdown in demand, both regionally in North America and globally, over the summer and fall of 2022. Consumer purchases began to normalize and then ebb later in the year due to rising inflation, higher interest rates and shifting consumer preferences. With demand softening there is a keen focus early in 2023 on the overall supply and demand picture for many Industrial Chemicals. In 2023 analysts expect a higher volume of new production entering resin and organic chemical markets.[1,2,3] In Canada, Inter-Pipeline and NOVA

[1] Argus Media, "Viewpoint: US 2023 Polyethylene prices under pressure," December 22, 2022.
[2] S&PGlobal, "Commodities 2023: Propylene, PP faces global supply overhang amid uncertain demand," December 27, 2022.
[3] John Richardson, "A flood of PP no matter what the 2023-2025 demand growth," ICIS Feb. 8, 2023.

Chemicals continue to progress production of their recent investments to full rates in 2023. As questions over supply and demand linger public Industrial Chemical companies have recently contextualized the situation noting that downstream manufacturers are focused on reducing inventory levels and completing backorders early in the year.[4] Companies expect these destocking trends to ease in the months to come with demand for Industrial Chemical products increasing as we progress into late spring and summer.[5]

In North America, a record level of housing units under construction and permitted will continue to support demand for building products a key downstream sector for resin and polymer demand. Canada has accepted a record number of permanent residents in 2022 and is set to continue that trend in 2023, providing incremental demand for physical goods including: housing, appliances, and vehicles.[6] Auto sector manufacturing continues to recover, but unit output remains approximately 25% below 2015-2019 levels, rates last seen during the Financial Crisis.[7] Higher auto production and sales would support demand for polymers and synthetic rubbers, which are used extensively in auto parts manufacturing. Strong crop prices, low global crop stocks and relatively high energy prices in Europe and Asia should support demand for chlor-alkali products. Additional tailwinds can be found in global markets where the full re-opening of Asian economies, including China, from COVID controls in 2023 should progress as we move further into the year.[8] European manufacturing has been resilient and energy prices have declined significantly since peaking in August opening the door for a much better economic situation than what was expected only a few months ago. The 70% decline in North American natural gas prices since late 2022 to levels last seen in March 2021 is a tailwind for many of Canada's Industrial Chemical producers.

For **2023 CIAC estimates 2-7% growth in Industrial Chemical shipments** with higher output and potentially volatile prices. Exports should also see gains closely tracking shipment levels. CIAC also expects an increase in railway throughput in 2023 of around 2-5% as volumes increase.

TRANSPORTATION NETWORK FLUIDITY AND ACCESS TO INTERNATIONAL MARKETS

Since the Canadian industrial chemistry industry is highly export-oriented, it is a strong supporter of free trade, particularly with the United States. Trade flows of Industrial Chemicals have exceeded pre-COVID levels on a value basis and are near pre-COVID volumetrically. We expect volumes to grow in 2023 as

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[4] Summary of Q4 2022 Earnings Reports from – Huntsman, Eastman, Lyondell-Basel, Dow, Shell, ExxonMobil, Olin Corporation, Chemtrade Income Holdings, Chemours Company, DoPont Denemours Inc, PPG, and Sherwin-Williams. Antoinette Smith, "H1 Plastics sales to remain low on destocking, ease in consumer spending: US DuPont," S&P Global Feb 7, 2023.

[5] Summary of Q4 2022 Earnings Reports from – Huntsman, Eastman, Lyondell-Basel, Dow, Shell, ExxonMobil, Olin Corporation, Chemtrade Income Holdings, Chemours Company, DoPont Denemours Inc, PPG and Sherwin-Williams.

[6] Benjamin Tal, "Housing Demand From Newcomers Even Stronger Than Perceived," CIBC Economics in Focus, Jan. 25, 2023.

[7] St Louis Fed, "Domestic Auto Production including Canada and Mexico," Feb. 9, 2023

[8] Kristen Hays, "Enterprise sees China Demand for Durable Plastics Rebounding in H2 2023," S&PGlobal Feb 1, 2023

Canada's recent Industrial Chemical investments reach full production. In recent years supply chain bottlenecks have been a focus for Canada's Industrial Chemical sector. A survey conducted by CIAC of its members in 2022 showed that nearly 75 percent of companies had experienced supply chain disruptions with the transportation network identified frequently. The federal government's Supply Chain Task Force report released in October 2022 was welcomed by CIAC and we were pleased to see several of our concerns reflected in the final recommendations. In 2023 we are working with the federal government to operationalize these recommendation to build a more resilient domestic supply chain. After a cold spell nation-wide in December, winter weather has been moderate in early 2023, allowing for the efficient movement of goods by truck and rail in what is normally a challenging part of the year. We expect continual improvements in supply chain congestion in 2023, especially transportation network fluidity and movement through ports, which will allow for greater volumes of Canadian chemistry products to reach global markets.

INVESTMENT ATTRACTION POLICY IN 2023

CLIMATE CHANGE POLICY AND THE NET ZERO TRANSITION

In July 2022 the federal government released the 2030 Emissions Reduction Plan to lower Canada's Greenhouse Gas Emissions 40-45 percent from 2005 levels. The government began consultations on adjustments and strengthening options to the Output Based Pricing System, which is required every five years. And in the fall the government began exploring options for an Oil and Gas sector specific emissions cap. In early 2021 the government consulted on a Border Carbon Adjustment (BCA) mechanism that will aim to ensure imported products into Canada face the same carbon pricing signals that domestic firms place but there have been no further announcements.

Canada's chemistry industry shares Canadians concerns on the impacts of a changing climate and the urgency of reducing emissions in line with scientific evidence and Canada's international commitments. Chemistry is vital to achieving the federal government's net zero carbon emission goals. Chemistry plays a crucial role in the supply chain for almost all manufacturing in Canada. Decarbonizing chemistry sector production and downstream supply chains will require significant investment in existing production facilities. Chemistry investors are taking notice. Lowering emissions while meeting demand is now fundamental to chemistry sector investment. Canada's chemistry and plastics sectors create some of the lowest greenhouse gas-intensive products on the planet. Failure to attract this investment means Canada will need to import low-emissions chemistry.

Since 2021 CIAC has been tracking sixteen global scale announcements by chemical companies to invest in Canada. These projects could lead to significant emissions intensity performance improvements from existing assets with a strong role for carbon capture and storage and utilization (CCUS) and clean hydrogen. Companies are looking at large scale battery storage and renewable energy generation for their electrical needs. Others will put Canada on the global map in battery material production.

However, none of these investments are guaranteed, competition for them is fierce and it is critical that all levels of government work together to secure them.

2022 saw the release of several investment attraction proposals. In the late spring the government released draft legislation and opened consultations on the Carbon Capture Storage Investment Tax Credit. The 2023 Fall Economic Statement in November saw the release of a framework for a Clean Hydrogen Investment Tax Credit, a Clean Technology Investment Tax Credit and a recommitment to reviewing the Scientific Research and Experimental Development (SR&ED) investment tax credit. CIAC participated in the first phase of consultations on the Clean Hydrogen Investment tax credit in early 2023. Each of these programs were welcomed in 2022, however, we also saw a dramatic rise in the competition for low emissions investment. In the summer, the U.S. passed the Inflation Reduction Act which committed hundreds of billions of dollars to attracting low emissions investment. The IRA included expanded production tax credits for CCUS, Clean Hydrogen production and battery production and deployment. The IRA also and introduced and refinanced numerous tax credits targeting renewable energy, electric vehicles, clean manufacturing and emissions reductions/industrial energy efficiency programs. The scope and scale of the IRA has fundamentally changed the global investment landscape. Throughout the fall and winter CIAC has been urging the federal government to increase the size and scope of its investment attraction programs to compete in this new reality.

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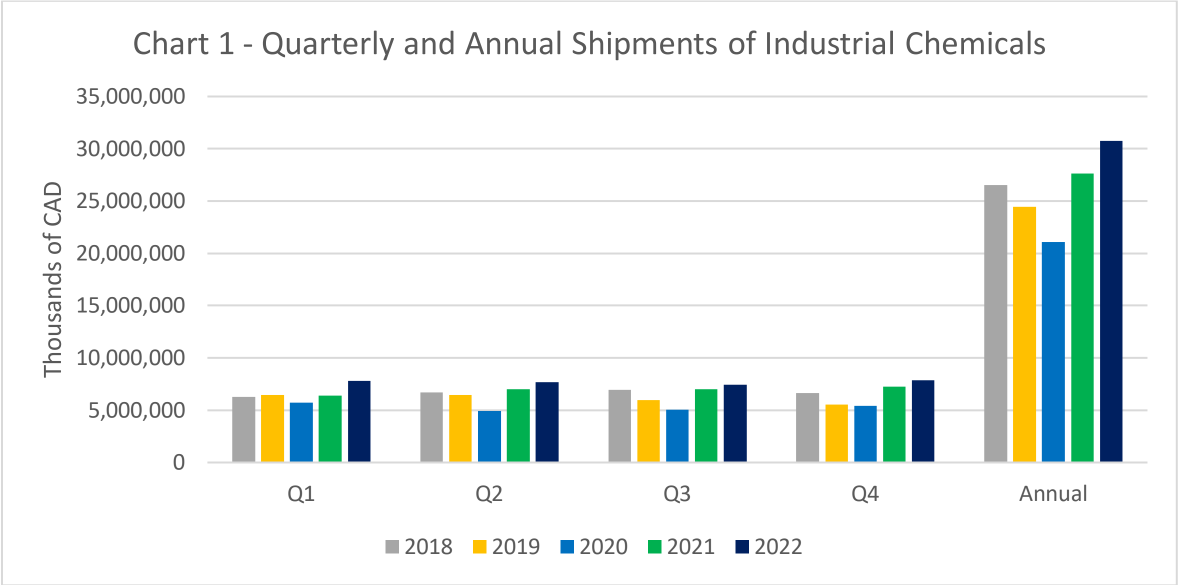
PRELIMINARY YEAR END STATISTICS FOR 2022

Chemical Sector Manufacturing	Year End Shipments in Billions of CAD	% Change from 2021 to 2022	% Change from 2018 to 2022
Industrial Chemicals	$30.8	11.2%	15.9%
Resin and Synthetic Rubber	$10.5	- 6.2%	4.0%
Basic Chemicals	$20.3	23%	23.8%
Petrochemicals	$7.4	34%	Flat
Industrial Gases	$1.8	34%	104%
Inorganic Chemicals	$3.9	26.4%	4.9%
Organic Chemicals	$6.8	35.8%	41.6%



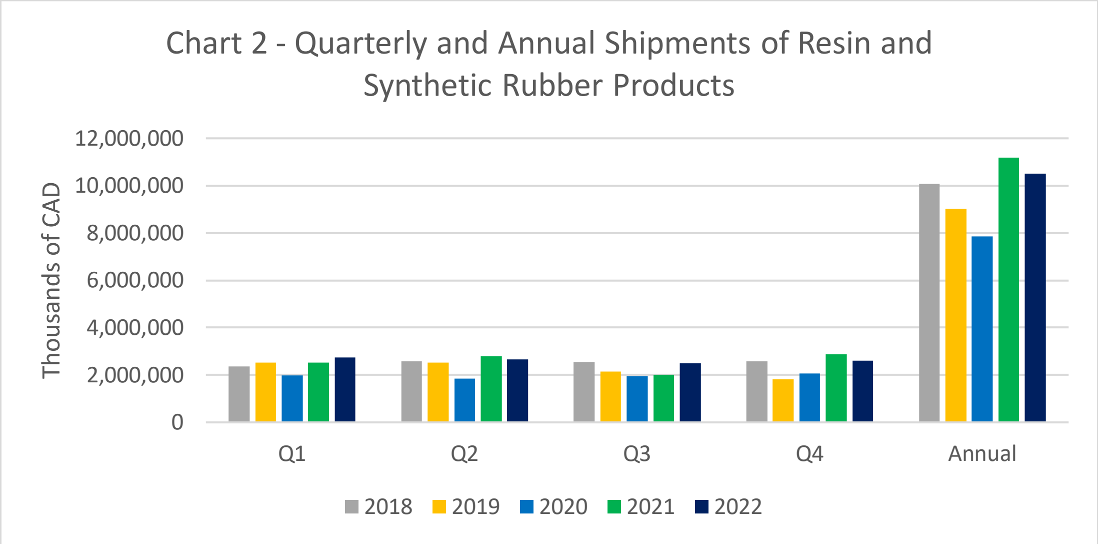


Chart 2 - Quarterly and Annual Shipments of Resin and Synthetic Rubber Products
Thousands of CAD
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Q1
Q2
Q3
Q4
Annual
2018
2019
2020
2021
2022

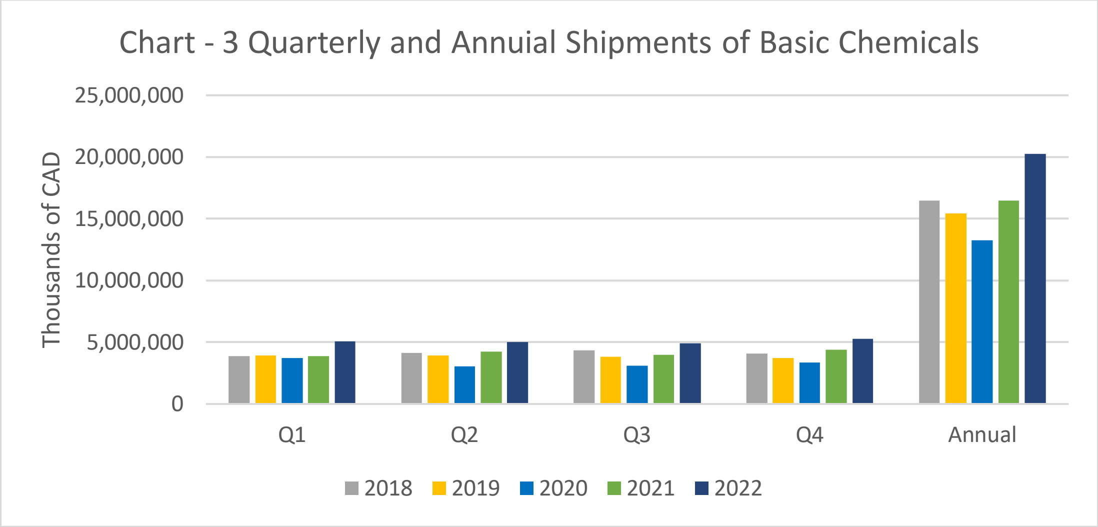


Chart - 3 Quarterly and Annuial Shipments of Basic Chemicals
Thousands of CAD
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Q1
Q2
Q3
Q4
Annual
2018
2019
2020
2021
2022

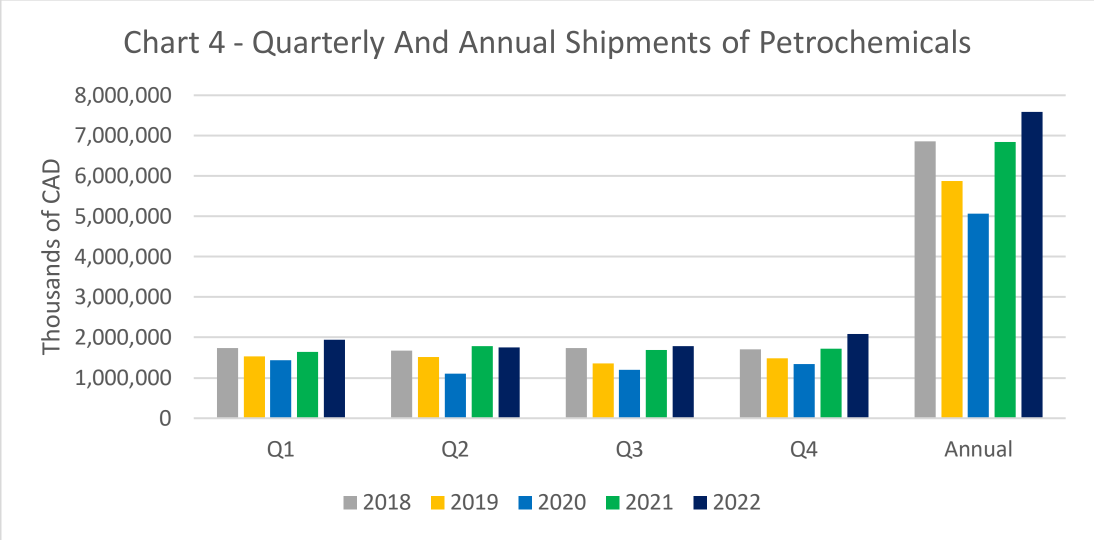


Chart 4 - Quarterly And Annual Shipments of Petrochemicals
Thousands of CAD
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Q1
Q2
Q3
Q4
Annual
2018
2019
2020
2021
2022

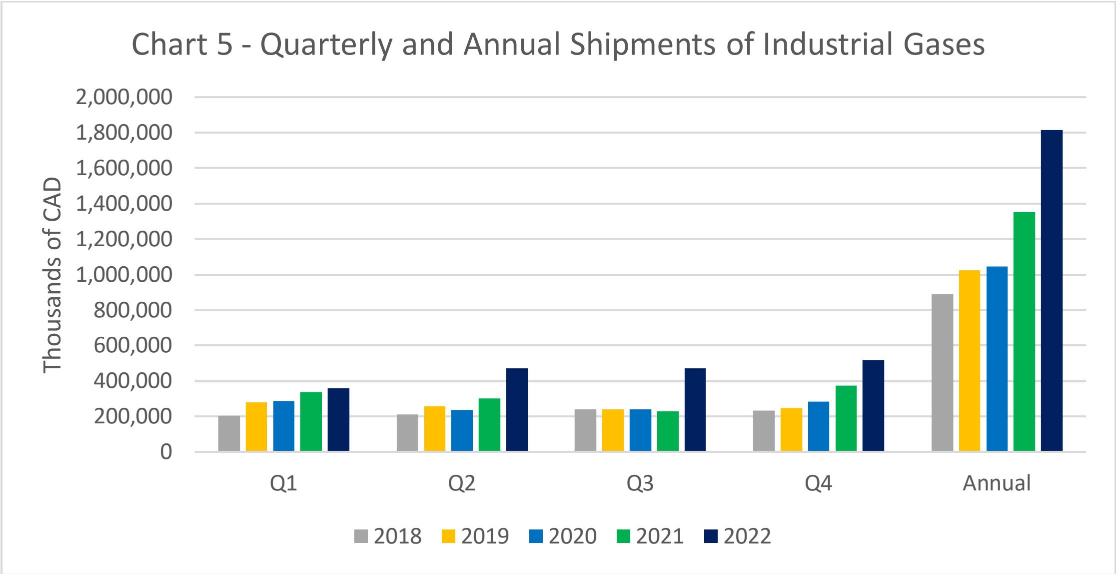


Chart 5 - Quarterly and Annual Shipments of Industrial Gases
Thousands of CAD
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Q1
Q2
Q3
Q4
Annual
2018
2019
2020
2021
2022

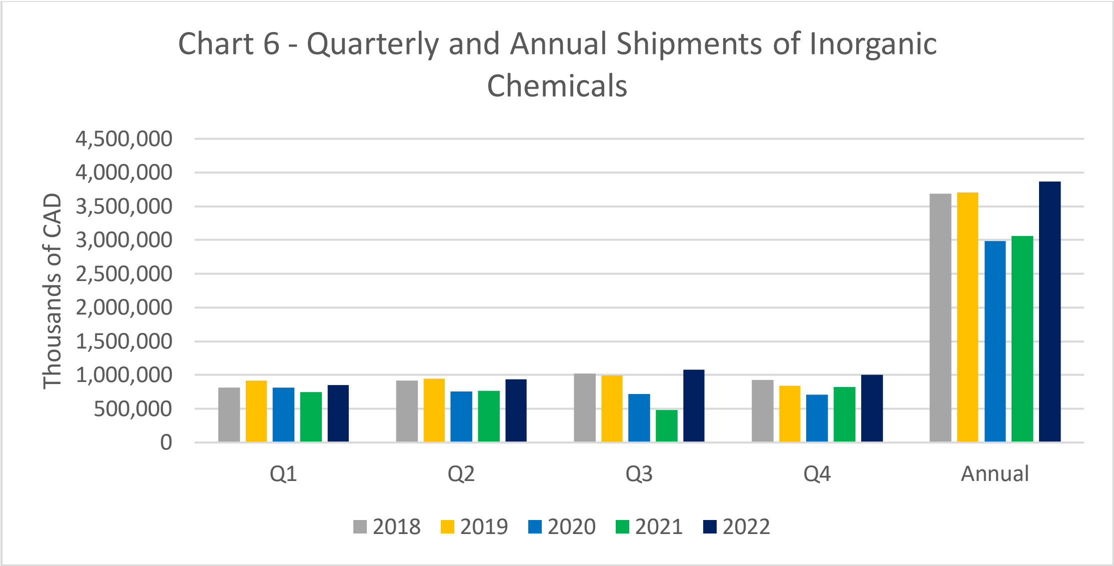
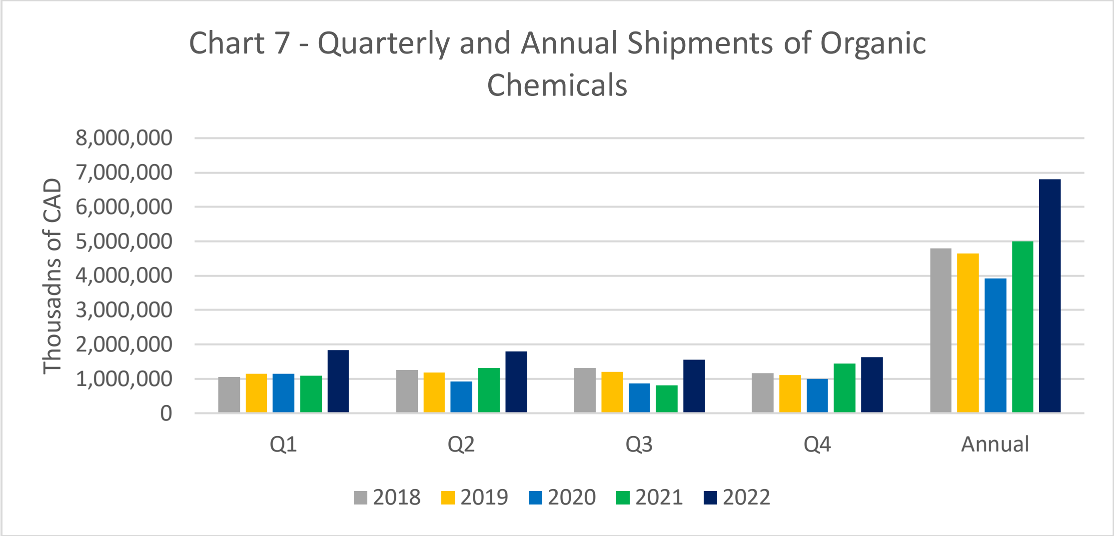


Chart 6 - Quarterly and Annual Shipments of Inorganic Chemicals
Thousands of CAD
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Q1
Q2
Q3
Q4
Annual
2018
2019
2020
2021
2022



MACROECONOMIC CONDITIONS IN EARLY 2023

Canada

The recent monetary policy tightening cycle has been the fastest and sharpest in decades. Since January 2022 the BoC raised interest rates by 4.25%. Which has sent the interest rates underlying housing mortgages, auto loans and consumer loans up sharply. Many credit products have reached multi-decade highs in recent months. Inflation pressures are also a headwind. Consumer prices in Canada are up 6.3% year over year to December 2022.[9] The twin impacts of high inflation and higher interest rates are weighing on Canadian consumers. Persistence of one or both of these trends will act as a headwind to demand in 2023.

In its January 2023 Monetary Policy Report, the Bank of Canada projected that full-year GDP growth in Canada will be 3.6% in 2022, which is a 0.75% decrease from its estimate in January 2022. The BoC forecasts the Canadian economy growing by 1.0% in 2023 and will return to trend growth of 1.8-2.0% in 2024. These estimates are slightly higher than private sector forecasts where the median estimate from 2023 growth is 0.4% in 2023.[10] The Bank also offered a few key messages on the economy as we enter 2023:[11]

- The labour market has been more resilient than expected, with robust job gains and the unemployment rate returning to near historical lows. Job vacancies have also eased by less than anticipated.
- The level of potential output has been revised up by less than gross domestic product (GDP). The economy is estimated to have been in greater excess demand in the second half of 2022

[9] Statistics Canada, "Consumer Price Index, December 2022," February 13 2023
[10] Average range of estimates from RBC, TD, BMO and Scotiabank.
[11] Bank of Canada, January 2023 Monetary Policy Report.

than previously projected. This is consistent with stronger labour demand. As a result, the projection begins with more excess demand and more domestic price pressures.

- The levels of economic activity and of potential output are both revised up over the projection period.
- The outlook for consumer price index inflation is revised down by about ½ a percentage point in 2023, mainly due to lower gasoline prices and a faster improvement in supply chain disruptions. At the same time, the outlook for core inflation is revised up, reflecting stronger demand.

The United States

In December 2022 the Federal Reserve Board projected U.S. GDP growth will be 0.5% in 2022 rising to 0.5% in 2023 and 1.6% in 2024. These projections are significantly different than projections in early 2022 which were estimating 2.2% growth in 2022. The U.S. economy is dealing with several economic crosscurrents. Inflation levels hit a multi-decade high of 8.2% in June 2022 as consumer spending, supply chain disruptions, commodity price inflation all rose over the last two and a half years. Consumer spending is currently normalizing from COVID-19 trends. Spending is shifting into services and demand for goods returning to trend. Consumer spending remains robust. To address very high inflation the Federal Reserve has been aggressively raising interest rates and tightening monetary policy since June. Interest rates are at their highest level since 2008, at 4.75% and has been achieved at the fastest pace in decades.

In 2023 increased interest rates and very high inflation levels are expected to slow the U.S. economy, especially interest rate sensitive sectors such as housing and durable good purchases. Analysts foresee a slow start to 2023, but momentum building later in the year. Demand for goods and services remains strong by historical standards and nationally employment is exceptionally strong with the unemployment rate reaching a six decade low in January 2023.[12] Consumers also have nearly $1 trillion USD in excess savings and the growth in housing prices over the last three years means many households are somewhat insulated from these headwinds. However, leading indicators such as housing activity and electronic goods orders have declined significantly since peaking in the spring. A decline in construction output in the latter part of the year also weighed on demand. Early data from January 2023 has pointed to underlying consumer strength in retail sales and overall job growth was ahead of expectations.

Global

The Euro Area is predicted to grow by 3.4% 2022 and grow by 0.2% in 2023.[13] Europe has faced a significant shock from the war in Ukraine. Energy costs skyrocketed, reaching record highs, as energy supplies were disrupted after Russia invaded Ukraine in February 2022. Inflation levels have reached double digits in 2022 and approached levels not seen in nearly 50 years in some countries. Euro Area

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[12] Lucia Mutikani, U.S. Reports Blowout Jobs Growth; Unemployment Lowest Since 1969, Reuters, February 3, 2023.

[13] Bank of Canada, January 2023 Monetary Policy Report, January 2023.

central banks have begun raising interest rates adding a further headwind. Natural gas prices have repeatedly spiked to record levels, far above any previous price spikes and led to downstream manufacturers, including industrial chemical manufacturers, to curb production. Even as energy prices have declined significantly in early 2023, energy intensive sectors in Europe face very large headwinds.

Growth in China is projected to be 3.0% in 2022 owing to the slowing of the housing sector and disruptive response to COVID-19. China had largely pursued a zero-covid approach and adopted sweeping lockdowns to stop the spread of the virus throughout 2022. These have caused significant disruption and has contributed to global supply chain disruptions. However, in late November 2022, Chinese authorities announced an abrupt end to zero-COVID and moved remarkably quickly to normalize with increasing economic growth now the focus of policy makers. To counteract headwinds from zero-COVID Chinese authorities throughout 2022, lowered interest rates, encouraged bank lending, and provided significant stimulus for investment in infrastructure and advanced manufacturing. 2023 may also benefit from a recovery in the property sector though the timing of this is uncertain. Stimulus measures combined with removing all COVID-19 restrictions should provide a tailwind for the Chinese economy in 2023 where the BoC estimates growth will reach 5.4%.[14] China's re-opening and further steps in Asian countries broadly to remove the last COVID-19 policies, should also provide a regional tailwind as Asian economies will be fully open for the first time since 2019.

The major Canadian banks are forecasting that the Canadian-to-U.S. dollar exchange rate will be in the range of $0.74-0.77 for 2023. Banks are projecting the average price for WTI crude oil will average $90 USD/barrel in 2023. Henry Hub natural gas is expected average US $3.75 per million BTU in 2023.

[14] Bank of Canada, January 2023 Monetary Policy Report.