

April 2023

B.C. Highway Construction Cost Indexes

The approved Construction Cost Indexes below should be used to adjust for inflation when converting a cost from a particular year to a cost for a different year. There are 2 important applications.

1. In accordance with existing Capital Program Board Policy, capital project budgets must consider inflationary impacts over the implementation schedule. In other words, the project cost estimate must be cash flowed and then adjusted for inflation.
2. The Indexes below can also be used to convert Historical Unit Price Construction Cost Data (HUPCCD) from a particular past year to the current year, for the purpose of developing a construction cost estimate for a new project. Note that an assumption will need to be made for the Year of the HUPCCD. One simple and conservative assumption is to just use the year in which the project was tendered.

Highway Construction Cost Indexes

Fiscal Year	Historical & Forecast Cost Index	Annual % Change from Prior Year	Annual % Change (What was predicted)
2011/12	71.884		
2012/13	72.978	1.52%	Not Available
2013/14	75.156	2.99%	Not Available
2014/15	76.758	2.13%	Not Available
2015/16	77.852	1.42%	2.95%
2016/17	78.351	0.65%	1.26%
2017/18	79.733	1.76%	2.01%
2018/19	80.827	1.37%	1.29%
2019/20	82.641	2.25%	2.17%
2020/21	85.040	2.91%	3.06%
2021/22	89.732	5.51%	5.07%
2022/23	95.991	6.97%	6.94
2023/24	100.000	4.18%	
2024/25	102.510	2.51%	
2025/26	105.011	2.44%	
2026/27	107.353	2.23%	
2027/28	110.005	2.47%	
2028/29	112.634	2.39%	
2029/30	115.326	2.39%	
2030/31	118.082	2.39%	

Historical Factual Values ¹
Future Forecast Values

¹ Historical Factual Values are based on Statistics Canada. Table 36-10-0106-01 **Gross domestic product price indexes, quarterly, Implicit price indexes - General governments final consumption expenditure category.**
<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610010601>

Given a Cost in Year A,

Cost in Year B = (Cost in Year A) x (Index for Year B) / (Index for Year A)

Note that the indexes apply to all elements of a cost estimate except property costs, which have a speculation component and thus require a separate analysis for inflation adjustments.

The indexes have historically been updated annually and published prior to each new fiscal year. However, given the extraordinary, unique, and evolving circumstances of the COVID pandemic, and the Ukraine/Russia conflict in February/March of 2022, more frequent updates were undertaken.

These forecasts all point conclusively that the recent spikes in prices as the world economies retool and begin to exit the COVID pandemic were medium-term in nature. We are likely to see these cost-pressures decrease further throughout 2023. As we are in a period where almost all Central Banks are following the lead of the US Federal Reserve to raise interest rates to combat inflation and excess demand post-pandemic, we need to factor this fact into our forecasts of inflation. The U.S. Federal Reserve raised interest rates numerous times in 2022 and 2023 as the central bank continues to try to tame multi-decade highs in inflation.

In summary, we can expect higher interest rates as inflation gradually comes down. A process that has already begun. Our model still predicts that inflation will be in 4 percent range by the end of 2023, and 2.5% the year after, with the forthcoming interest rate hikes and the pending recession.

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Background:

As we are in a period where almost all Central Banks are following the lead of the US Federal Reserve to raise interest rates to combat inflation and excess demand post-pandemic, we need to factor this fact into our forecasts of inflation. The U.S. Federal Reserve raised interest rates by 0.75% three consecutive times in addition to smaller increases, as the central bank continues to try to tame multi-decade highs in inflation.

As can be seen by the table below, we are no where near the high Central Bank/Federal Reserve that Paul Volcker, former Federal Reserve Chairman, used in the 1980s to fight inflation. As history bears out Mr. Volcker was very successful in wrestling down inflation. Moreover, Mark Carney, former BOC and BOE Governors indicated that we need to raise interest rates above inflation to decrease inflation down to the 2% to 3% range. In a nutshell, we are likely to see more interest rate hikes by Central banks, as warranted. Also, as per the chart below, each time rates were raised historically, it triggered a recession during or shortly thereafter. We have not reached the point where we are in an official recession, thus further leading to the expectation that most Central banks will continue to raise rates to combat inflationary pressures.

Moreover, each country has an additional incentive to raise their central bank rates to match the US Federal Reserve or risk import-based inflation.

Can the Federal Reserve keep raising interest rates and defeat the nation's worst bout of inflation in 40 years without causing a recession?

Not according to a new research paper that concludes that such an “immaculate disinflation” has never happened before. The paper was produced by a group of leading economists, and three Fed officials addressed its conclusions in their own remarks Friday at a February 24, 2023 conference on monetary policy in New York.

When inflation soars, as it has for the past two years, the Fed typically responds by raising interest rates, often aggressively, to try to cool the economy and slow price increases. Those higher rates, in turn, make mortgages, auto loans, credit card borrowing and business lending more expensive.

But sometimes inflation pressures still prove persistent and require ever-higher rates to tame. The result — steadily more expensive loans — can force companies to cancel new ventures and cut jobs and consumers to reduce spending. It all adds up to a recipe for recession.

And that, the research paper concludes, is just what has happened in previous periods of high inflation. The researchers reviewed 16 episodes since 1950 when a central bank like the Fed raised the cost of borrowing to fight inflation, in the United States, Canada, Germany and the United Kingdom. In each case, a recession resulted.

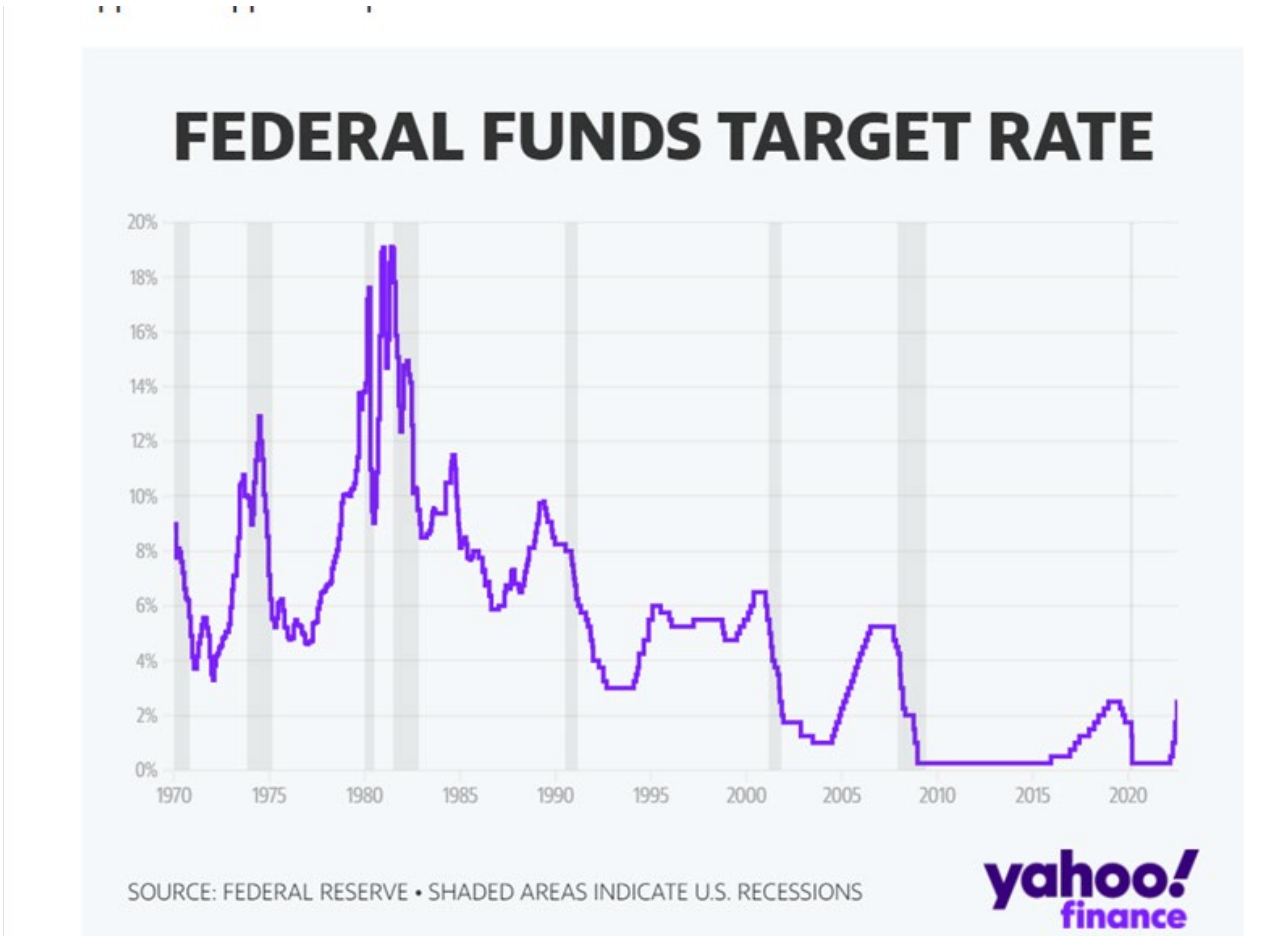
“There is no post-1950 precedent for a sizable ... disinflation that does not entail substantial economic sacrifice or recession,” the paper concluded.

The paper was written by a group of economists, including: Stephen Cecchetti, a professor at Brandeis University and a former research director at the Federal Reserve Bank of New York; Michael Feroli, chief U.S. economist at JPMorgan and a former Fed staffer; Peter Hooper, vice chair of research at Deutsche Bank, and Frederic Mishkin, a former Federal Reserve governor.

The paper coincides with a growing awareness in financial markets and among economists that the Fed will likely have to boost interest rates even higher than previously estimated. Over the past year, the Fed has raised its key short-term rate eight times.

<https://ca.finance.yahoo.com/news/feds-rate-hikes-likely-cause-162504392.html>

In summary, we can expect higher interest rates as inflation gradually comes down. **Our model still predicts that inflation will be in the 4 percent range by the of 2023, with more potential interest rate hikes and the pending recession.**



The following are highlights of two sources of the robust estimating sources used in forecasting expected inflation and cost-escalation: (1) TD Economics² and (2) Consensus Economics for commodities and materials.

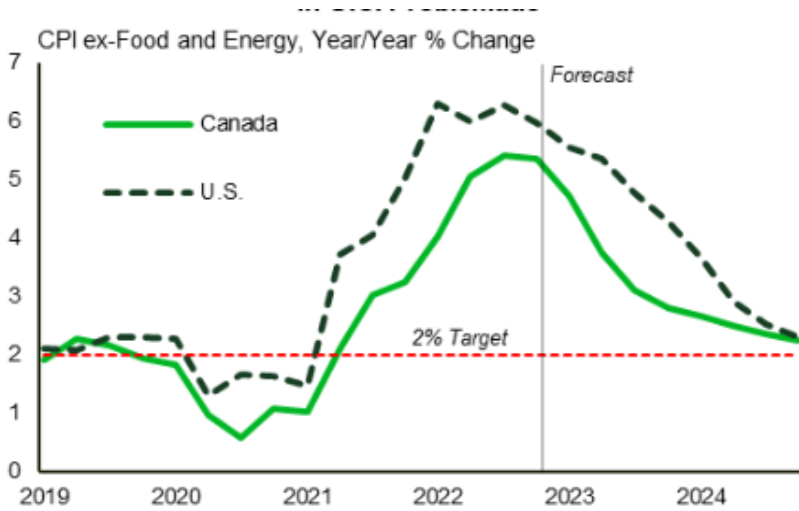
These forecasts all point conclusively that the recent spikes in prices as the world economies retool and begin to exit the COVID pandemic were short-term to medium term in nature. The same expectation is to be seen regarding the Ukraine/Russia crisis as supply chains adjust to this new normal of the ongoing conflict, regarding inflation and economic growth. We are likely to see these cost-pressures continue to decrease throughout 2023 and into 2024.

TD Economics: March 15, 2023 draw/update

- In contrast to the U.S., Canada's economy ended 2022 on a soft note, with overall activity stagnant in the fourth quarter.
- We expect job gains to slow dramatically in the coming months, as employers must reconcile with incredibly weak productivity and contracting profits.
- The impact of higher borrowing costs should also build on consumer patterns as the year rolls forward and more households face mortgage renewals at higher interest rates. Some households may be able to skirt the immediate impact on budgets by adjusting to longer amortization periods, but not all. And even for those in the first category, the longer period required on servicing debt can lead to a more cautious approach to discretionary spending.
- All the inflation indicators on the Consumer, Producer, and Industrial sectors indicate inflation to decrease to the 3% to 4% range in 2023 and to the Bank of Canada's target rate of 2% in 2024. See Canadian Outlook chart and table below (CPI, CPIX, BoC Inflation).
- Real GDP per worker (a measure of productivity) in the table below shows that the decline that began in 2022 will continue until 2024.

² Canadian Quarterly Economic Forecast: Date Published: March 15, 2023, TD Economics.

Source: Statistics Canada, Bank of Canada, Canada Mortgage and Housing Corporation, Haver Analytics, TD Economics.



Source: BLS, Statistics Canada, TD Economics.

- Also housing starts are predicted to drop due to high interest rates that home purchasers will not be able to afford. This will free up capacity for construction in the non-residential sector.
- Given the expected slowing in demand, the underlying economic dynamics won't be sufficient to generate enough jobs to absorb people entering the labour force or those already on the sidelines. This means the unemployment rate should push higher. It has already risen from a low of 5.1% to 5.4% and is expected to reach 6.5% in 2024.

Canadian Economic Outlook

[Period-Over-Period Annualized Per Cent Change Unless Otherwise Indicated]

Economic Indicators	2022				2023				2024				Annual Average			4th Qtr/4th Qtr		
	Q1	Q2	Q3	Q4	Q1F	Q2F	Q3F	Q4F	Q1F	Q2F	Q3F	Q4F	22	23F	24F	22	23F	24F
GDP Deflator (y/y)	8.8	9.6	7.0	4.2	1.8	-0.4	1.5	2.8	2.7	2.6	2.4	2.4	7.4	1.4	2.5	4.2	2.8	2.4
Nominal GDP	15.4	16.8	-2.5	-2.7	3.7	3.5	2.7	2.7	2.7	3.0	3.3	3.6	11.0	2.2	3.0	6.4	3.2	3.2
Labour Force	1.1	1.4	-0.1	2.2	4.3	1.5	0.9	0.8	0.8	0.8	0.8	0.8	1.5	2.0	0.9	1.1	1.9	0.8
Employment	3.3	4.0	-0.1	2.2	4.5	0.5	-0.4	-0.5	-0.5	-0.1	0.4	0.9	4.0	1.8	-0.1	2.3	1.0	0.2
Change in Empl. ('000s)	157	191	-4	109	219	24	-19	-24	-24	-3	18	46	750	349	-27	453	200	38
Unemployment Rate (%)	5.7	5.1	5.1	5.1	5.1	5.3	5.6	5.9	6.2	6.4	6.5	6.5	5.3	5.5	6.4	--	--	--
Personal Disp. Income	14.6	5.6	2.0	12.4	8.4	2.3	2.4	2.2	2.5	2.7	2.9	3.0	5.2	5.8	2.5	8.5	3.8	2.8
Pers. Savings Rate (%)	8.1	5.0	5.0	6.0	6.5	5.9	6.1	6.2	6.3	6.4	6.4	6.4	6.0	6.1	6.4	--	--	--
Cons. Price Index (y/y)	5.8	7.6	7.1	6.6	5.4	3.5	3.1	2.7	2.5	2.4	2.3	2.1	6.8	3.7	2.3	6.6	2.7	2.1
CPIX (y/y)**	4.9	6.0	5.9	5.7	4.8	3.6	3.0	2.8	2.6	2.5	2.4	2.3	5.6	3.5	2.4	5.7	2.8	2.3
BoC Inflation (y/y)***	2.7	4.1	5.1	5.2	4.7	3.4	2.9	2.7	2.5	2.4	2.3	2.2	4.3	3.4	2.3	5.2	2.7	2.2
Housing Starts ('000s)	241	271	281	258	228	228	222	216	212	207	205	202	263	223	206	--	--	--
Home Prices (y/y)	17.0	3.4	-4.8	-11.2	-20.0	-13.1	-5.6	-2.6	1.2	3.0	3.3	3.3	0.8	-10.8	2.7	-11.2	-2.6	3.3
Real GDP / worker (y/y)	-1.7	-0.6	0.4	-0.3	-0.9	-0.8	-1.4	-0.7	0.4	0.5	0.6	0.6	-0.5	-0.9	0.5	-0.3	-0.7	0.6

F: Forecast by TD Economics as at March 2023.

Home price measure shown is the CREA Composite Sale Price.

* Intellectual Property Products. ** CPIX: CPI excluding the 8 most volatile components.

*** BoC Inflation: simple average of CPI-trim and CPI-median.

Source: Statistics Canada, Bank of Canada, Canada Mortgage and Housing Corporation, Haver Analytics, TD Economics.

Consensus Economics: Survey of March 20, 2023

Overview

Commodity markets have been affected by the wider turmoil created by the collapse of SVB and Signature Bank in the US, and Credit Suisse in Europe earlier this month. The risk of contagion to other banks in these regions has created a more risk averse environment for investors and businesses and added to downside pressures on the price of many commodities. This has been particularly apparent for those in which demand is intrinsically linked to the business cycle, as turmoil in financial markets is likely to weigh heavily on the near-term macro outlook. **Crude oil** (pages 4 and 5) was among those that suffered the most dramatic slumps in price. Banking sector instability has occurred at the same time that observers openly expressed concerns about over-supplied oil markets amid reports of high inventory levels in major economies.

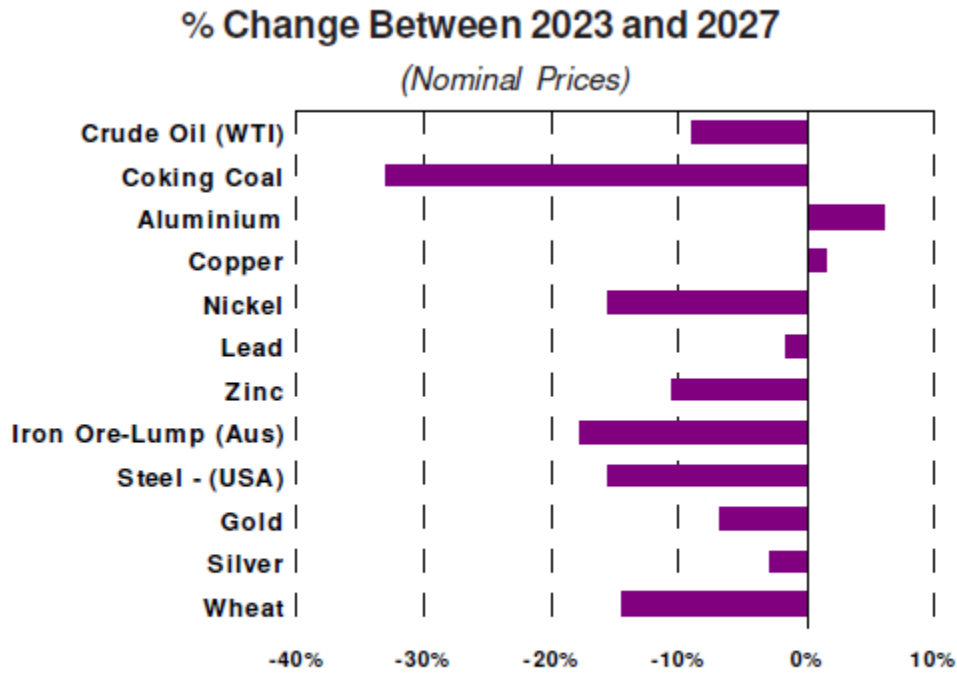
MARCH 2023

LONG TERM FORECASTS

Individual nominal forecasts available in the Excel spreadsheet.

Long-term price forecasts provide a foundation for expected returns from both existing production facilities and those under development. In addition to their annual forecasts for the years 2023 to 2027 the table below summarises our panel's Long-Term 5-10 year average estimates (2028-2032) in nominal and real (inflation adjusted) current year dollar terms.

See individual commodity pages for mineral specifications	US\$ Average	Consensus Forecasts						
		(US\$ Nominal, Annual Averages)					Long-Term (2028-2032 Average)	
		2022	2023	2024	2025	2026	2027	Nominal
Crude Oil - Brent	99.9	86.08	85.73	81.64	79.64	77.12	77.11	68.41
- WTI	94.64	80.91	81.76	78.29	76.51	73.62	73.07	64.87
Natural Gas - US, \$	6.522	3.710	4.069	4.297	4.166	4.116	4.457	3.784
- LNG, \$	33.22	21.98	22.50	20.21	23.27	24.40	25.67	23.50
Coking Coal - Contract	347.1	282.5	230.7	213.0	196.0	189.0	197.1	168.9
Thermal Coal - Contract	254.02	262.8	186.3	178.5	133.3	116.4	105.13	90.75
- Spot	288.1	258.4	196.0	138.5	116.7	103.0	107.6	89.4
Uranium	50.52	53.82	53.82	55.33	54.60	54.07	52.80	46.36
Aluminium	2707	2434	2537	2579	2597	2583	2876	2563
Alumina	361.8	332.4	334.3	341.8	347.8	358.4	412.6	359.3
Copper	8822	8466	8674	8515	8556	8607	8639	7669
Nickel	26249	23618	21226	20832	20325	19938	21064	18179
Lead	2156	2078	2055	1984	2006	2045	2241	1983
Zinc	3488	3052	2944	2760	2727	2732	2873	2490
Cobalt	31.27	21.84	25.12	26.42	25.72	24.26	27.18	22.05
Tin	31348	23437	22775	22685	22194	22002	25647	22450
Manganese	6.068	5.196	5.153	5.132	5.196	5.330	5.311	4.350
Molybdenum	18.45	22.10	15.03	13.90	12.62	11.61	10.82	9.695
Rutile	1271.9	1335	1316	1388	1414	1408	1411	1350
Zircon	1644	1687	1641	1693	1677	1662	1635	1550
Lithium - Carbonate	71.70	54.88	35.00	26.84	21.56	19.85	16.62	12.83
Steel - HRC, Europe	955.5	756.2	722.9	695.7	719.1	698.3	524.3	455.3
HRC, USA	1048	846	746.7	707.7	731.9	713.4	615.6	552.5
HRC, China	586.9	562.9	570.6	567.2	591.9	584.9	471.9	412.5



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