

# 498 Term Project Check-In

## Team 6

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The last two years of the global economy have been severely affected by major events such as the Coronavirus Pandemic, OPEC manipulation of the oil market, the Russia-Ukraine conflict, monetary policy and global net-zero emission initiatives. These events have set in motion inflationary pressures that affect many industries across civilian, commercial, and governmental institutions. Most notably, the rise of oil prices have created issues such as supply chain disruptions, industrial production slow-down, and increased commodity & energy prices; leading to general inflation in all goods and services. The construction industry is no exception with StatsCanada reporting a surge in the building construction price index of 21.7% for residential buildings and 11.2% for non-residential.

The goal of our project is to use predictive analysis to help governments and companies adapt their construction practices to minimize the effect of commodity inflation. Ultimately, the vision is to improve triple bottom line performance of construction projects in the form of efficient spending of tax-payer dollars, effective delivery of critical infrastructure, and environmental sustainability.

In order to achieve these objectives, our project will focus on the inflation of commodities of oil, steel, concrete and wages; specifically affecting the regions of Canada and the United States. The project has 3 focus areas: optimizing financial performance, minimizing project scheduling disruptions, and evaluating long-term strategies to shift from carbon powered projects to alternative fuel sources. The variables analyzed in this project are not limited to, but will include:

1. Economic Conditions
  - a. Inflation
  - b. Currency exchange rates, regional tax rates, carbon tax rates, GDP, interest rates, etc.
2. Geographic Regions
3. Geo-Political Conditions
  - a. Armed conflicts, economic cooperation, etc.
4. Construction Material Costs
  - a. Oil, steel, other commodities
5. Labor Conditions
  - a. Wage rates, employment rates, skilled labor supply

The general methodology will be to organize and analyze historical data to identify trends and correlations between inflation and the variables mentioned above. These correlations can then be used to extrapolate into the future to aid in construction planning. The potential data sources for all variables are outlined in the table below. In order to improve the performance of our models, we will narrow the scope of the project based on preliminary findings. Our proposed method of validation is to train the model up to 2019 (pre-Covid 19) and use the data from this point onwards to test our models.

Area of Interest	Description	Data Source	Link
Carbon vs Alternate fuel sources	Cost to Adapt new methods	Open Energy Data initiative	<a href="https://data.openei.org/submissions/106">https://data.openei.org/submissions/106</a>
	Internal Rate of Return	Statista	<a href="https://www.statista.com/statistics/1260208/us-internal-return-rate-of-oil-and-gas-fields-by-location/">https://www.statista.com/statistics/1260208/us-internal-return-rate-of-oil-and-gas-fields-by-location/</a>
Geo-politics	Global Conflict	Peace Research Institute Oslo	<a href="https://www.prio.org/Data/">https://www.prio.org/Data/</a>
		Uppsala conflict data program	<a href="https://ucdp.uu.se/">https://ucdp.uu.se/</a>
Economic conditions	Global currency exchange rates index	Organization for Economic Co-operation and Development	<a href="https://data.oecd.org/conversion/exchange-rates.htm">https://data.oecd.org/conversion/exchange-rates.htm</a>
	World Corporate Tax Rates	data.world	<a href="https://data.world/sya/corporate-tax-rate?fbclid=IwAR2hLKasUKsBtMG_SoE1mhp5YDuk1KXV0sk_YbFECQJC8LckbTrd9LOKYdk">https://data.world/sya/corporate-tax-rate?fbclid=IwAR2hLKasUKsBtMG_SoE1mhp5YDuk1KXV0sk_YbFECQJC8LckbTrd9LOKYdk</a>
	Carbon Tax Rates	The World Bank	<a href="https://carbonpricingdashboard.worldbank.org/map_data">https://carbonpricingdashboard.worldbank.org/map_data</a>
	GDP of Countries	Open Energy Data initiative	<a href="https://data.oecd.org/gdp/gross-domestic-product-gdp.htm">https://data.oecd.org/gdp/gross-domestic-product-gdp.htm</a>
	Interest Rates of US Dollar	Economic Research: Federal Reserve Bank St. Louis	<a href="https://fred.stlouisfed.org/series/FEDFUNDS">https://fred.stlouisfed.org/series/FEDFUNDS</a>
Construction material costs	Commodity Prices	Economic Research: Federal Reserve Bank St. Louis	<a href="https://fred.stlouisfed.org/tags/series?t=oil%3Bprice">https://fred.stlouisfed.org/tags/series?t=oil%3Bprice</a>
	Oil Prices: North America	Economic Research: Federal Reserve Bank St. Louis	<a href="https://fred.stlouisfed.org/series/WCOILWTICO">https://fred.stlouisfed.org/series/WCOILWTICO</a>

	OPEC Policy	Organization of the Petroleum Exporting Countries (OPEC)	<a href="https://asb.opec.org/data/ASB_Data.php">https://asb.opec.org/data/ASB_Data.php</a>
	Structural Steel Prices	Economic Research: Federal Reserve Bank St. Louis	<a href="https://fred.stlouisfed.org/series/PCU33231233231211">https://fred.stlouisfed.org/series/PCU33231233231211</a>
Labor	Canada Construction: Union Wage Rates	Statistics Canada	<a href="https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810013901">https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810013901</a>
	Employment rates	Economic Research: Federal Reserve Bank St. Louis	<a href="https://fredblog.stlouisfed.org/2015/11/the-evolution-of-employment-costs-in-the-private-and-public-sectors/">https://fredblog.stlouisfed.org/2015/11/the-evolution-of-employment-costs-in-the-private-and-public-sectors/</a>
	Skilled labor supply: US labor Statistics based on Occupation	US Bureau Labor of Statistics	<a href="https://www.bls.gov/home.htm">https://www.bls.gov/home.htm</a>