

# Managing Transportation Demand in a Volatile and Uncertain Environment



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# Purpose



**Context**



**Overview of Performance**



**Key Drivers & Challenges**



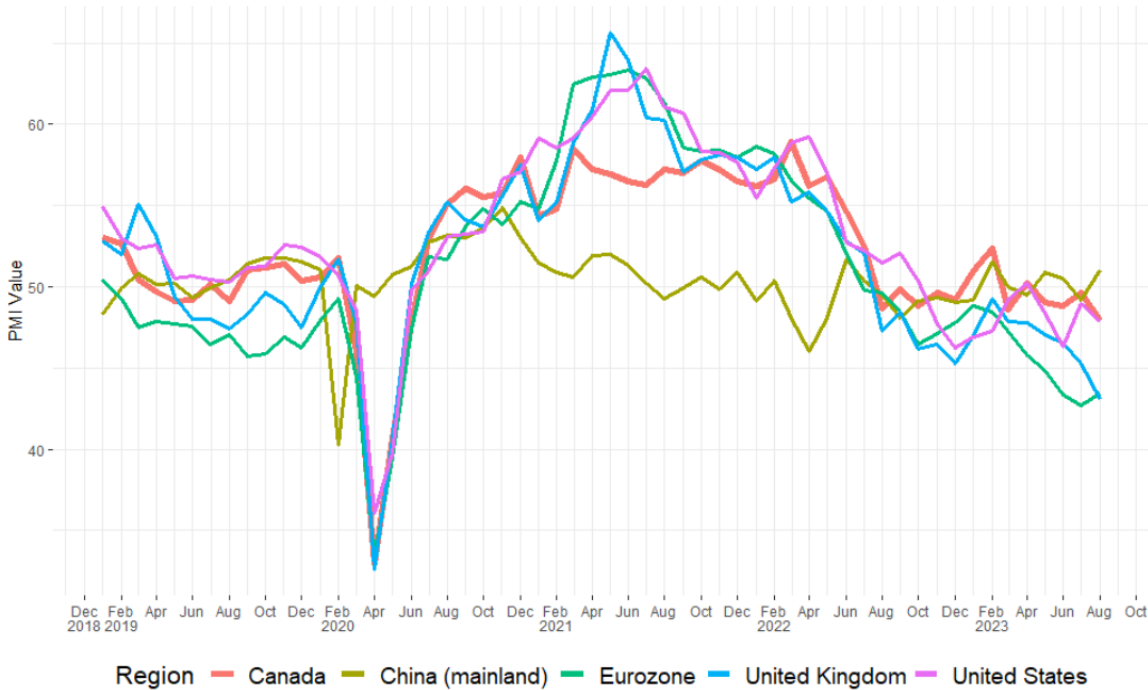
**Global and domestic outlook**



**Moving Forward - Fostering resiliency**

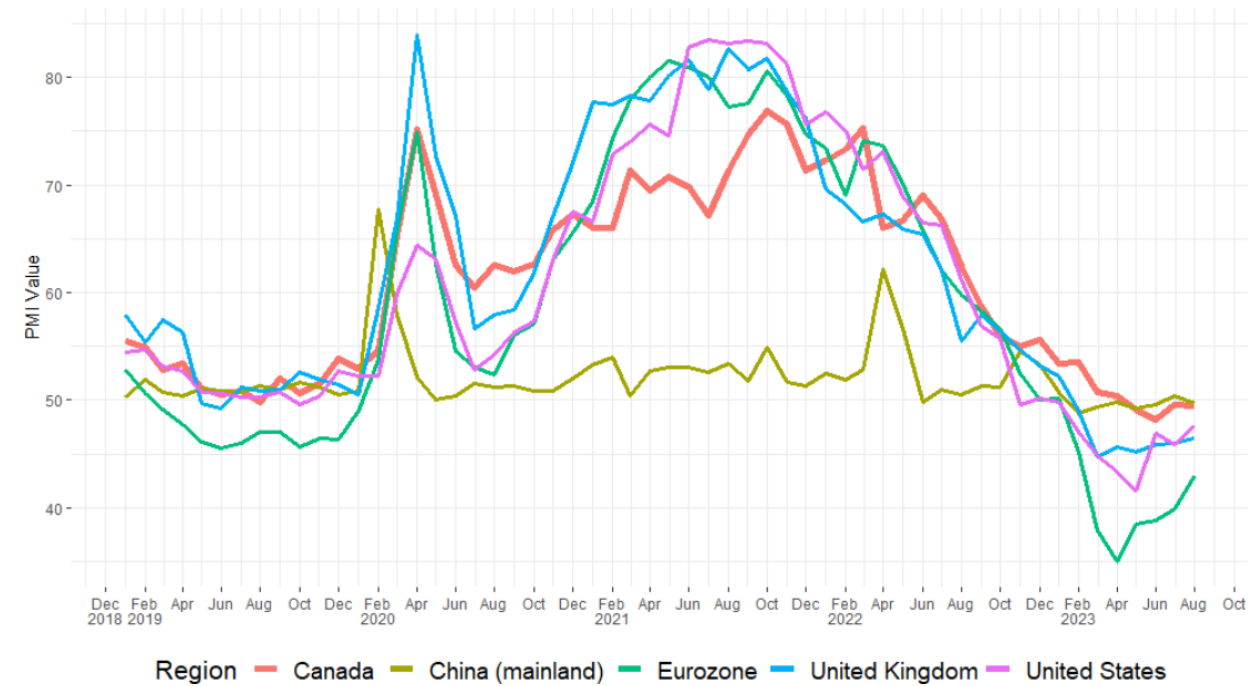
# Softer post-pandemic global demand has contributed to ease supply chain pressure

## PMI Manufacturing



Source: S&P Global

## Supplier's Delivery Times (Inverted)



Source: S&P Global

- Manufacturing sector in most advanced economies contracted further in recent months amid weaker global demand,
- Delivery times continue to improve across all regions as transportation bottlenecks ease and global demand weakens, notably in Europe.

# Despite slowing economic conditions, growing evidence of a soft landing at the global and domestic levels...



Global GDP continues to grow, though at a **slower pace**, with significant regional differences

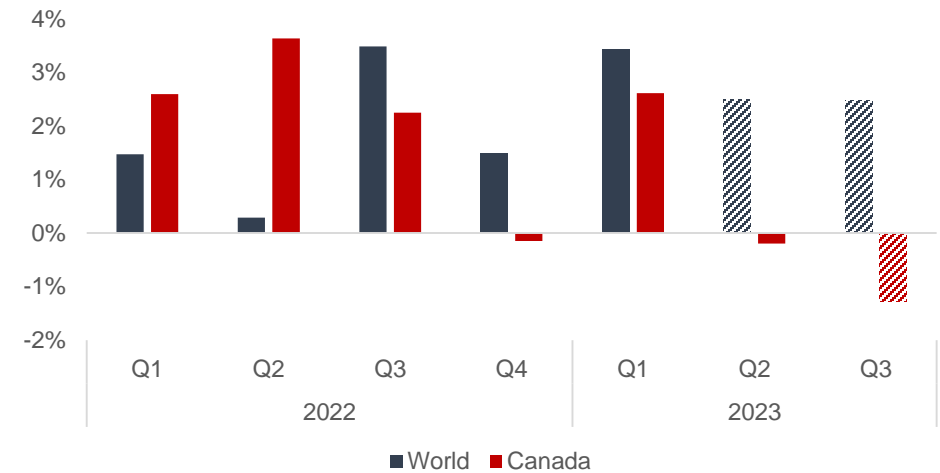
- **Inflation** pressures are slowing, but remain a concern, and **monetary policy tightening** weighing on developed economies' consumption
- China and Europe have shown early signs of significant cooling



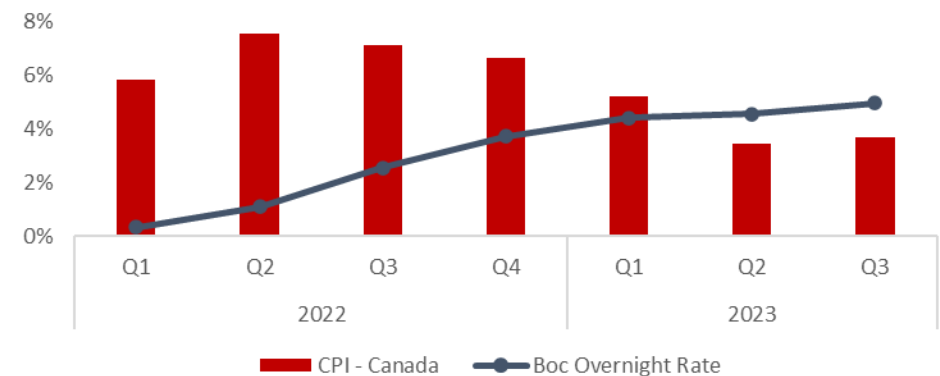
Canadian GDP realized **solid gains** in Q1 2023 but remained nearly unchained in Q2 2023

- **GDP growth** led by **consumer spending** and **exports** in Q1 2023 tapered in Q2 2023
- **Commercial building activity** continues to **increase**, while **housing activity** continues to **decrease**
- Persistent **inflation** led by higher energy prices, is a concern
- A **soft landing** is expected as:
  - Labour market remains strong
  - Stronger growth in the U.S., Canada's main trade partner, will support demand for **exports**

GDP



Canada Inflation & Interest Rate



\*2023 Q2 world GDP is based on preliminary estimates

Sources: IMF, World Bank, Statistics Canada, Oxford Economics, Bank of Canada



# ... and weak economic conditions have begun to weigh on key transportation demand for key commodities



Some **cyclical**/economically sensitive commodities are showing signs of **slowing** growth

Ex: Containers, wood products, etc.













Demand for **export** of bulk commodities remains **robust**

Ex: Potash, grain, autos, etc.



**Market share challenges** have shifted container imports from key Canadian ports

Ex: Prince Rupert, Montreal

Year to Date Commodity Market Growth*			
Commodity		YTD 2023	
	Grain		Limited world supplies driving demand & recovery from poor harvest
	Coal		Chinese demand increased - low inventory of energy products and increased auto production
	Autos		Improved parts availability
	Chemicals		Slowing US demand for fuels
	Potash		Strong demand North American demand but lost market share to Russia in Asia
	Containers		Retail growth slowing in response to monetary policy
	Wood		Cooling US housing market
	Crude Oil		Moderate demand but onboarding new tech for moving crude by rail

\* % change of trade volume (individual units vary by commodity)

**Source:** Wood Mackenzie, Commodities Research Unit, Forest Economic Advisors, LMC Automotive, Pulp and Paper Products Council, Food and Agriculture Organization, Hacket Maritime, Securities and Exchange Commission filings

# ...causing growth in Canadian freight movements to slow or decline

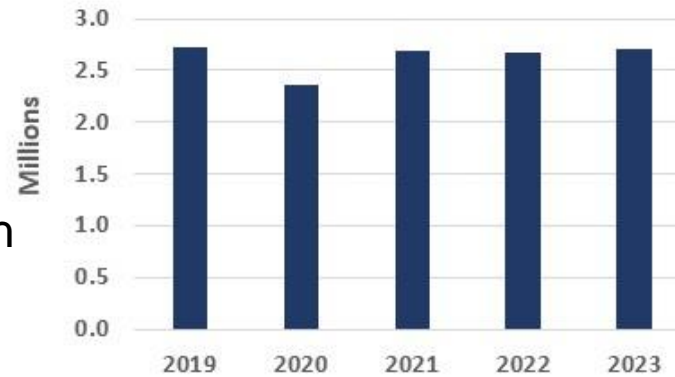
Overall, freight movements in Canada have flattened or declined post-pandemic

- **Containerized cargo** through ports and rail has plunged in 2023 reflecting lower consumption and economic activities.
- Export of **bulk commodities** remains in high demand (e.g. potash, grain, coal)
- **Air cargo** continues to be driven by e-commerce and high-valued/time-sensitive product (i.e. electronics, pharmaceutical, auto parts).

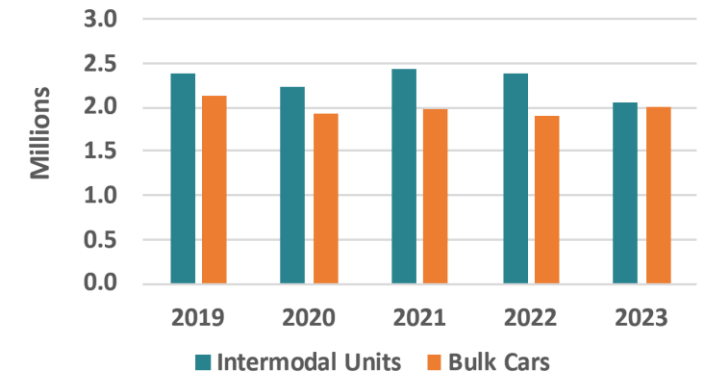
## YTD 2023 vs same period in 2022:

- Trucks entering Canada: **+1%**
- Bulk rail cars: **+5%**
- Rail intermodal units: **-14%**
- Marine port containers: **-16%**
- Air cargo: **+10%**

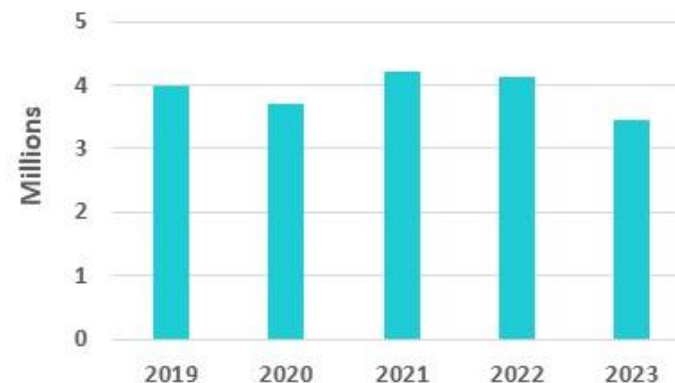
Number of Trucks Entering Canada, YTD Jan-June



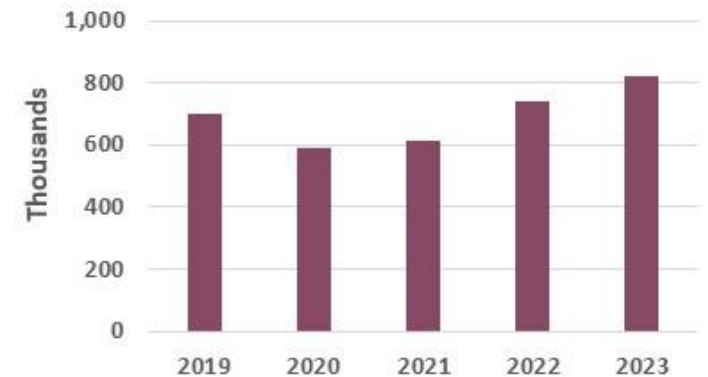
Number of Railcar Movements, YTD Jan-Aug



Number of Containers Handled by Marine Ports, YTD Jan-July

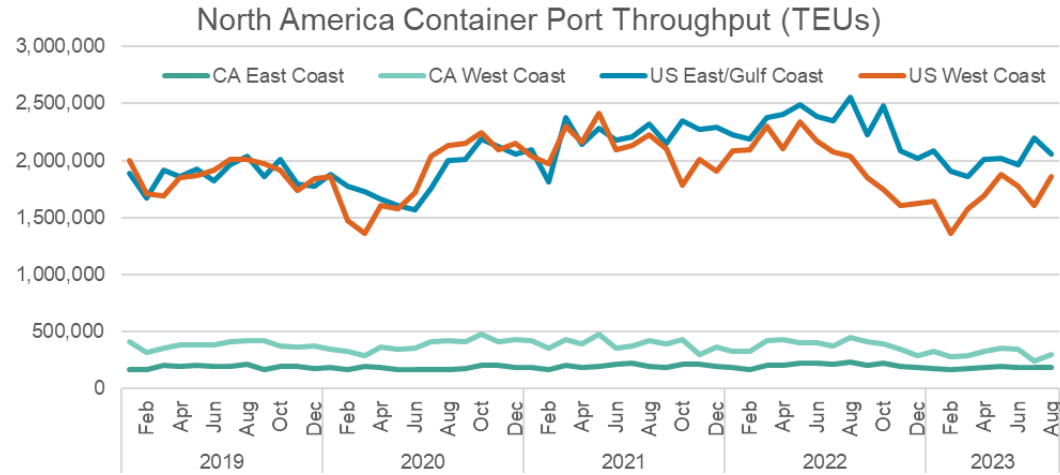


Tonnes of Air Cargo Handled at Airports YTD Jan-June



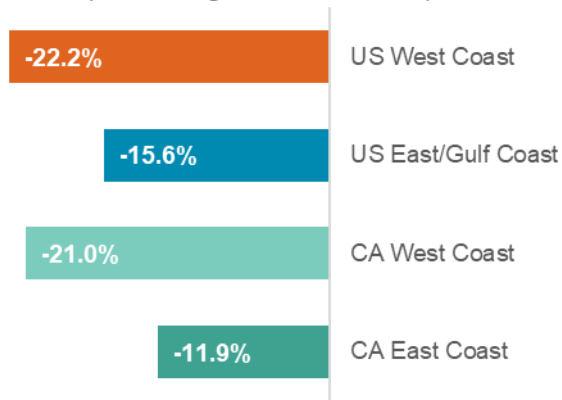
# Containerized traffic has significantly declined through the first eight months of 2023...

## PORT VOLUMES

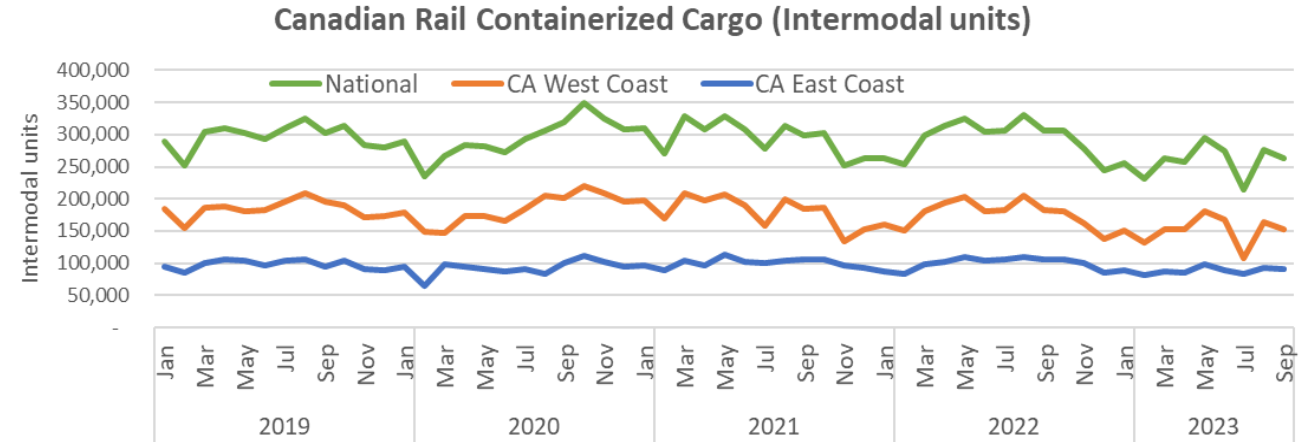


- Volumes on the NA west coast have decreased more than the east coast through YTD Aug 2023, following a year where the NA east coast gained market share from the west

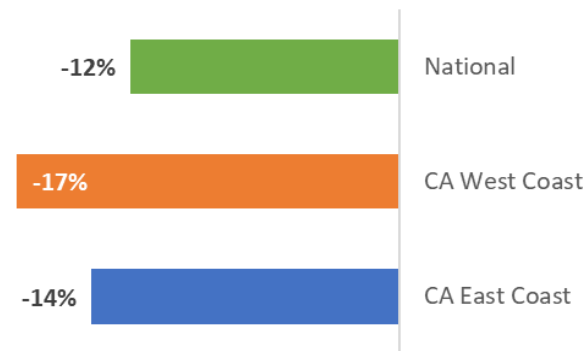
Container Port % Change (YTD Aug 2023 vs 2022)



## RAIL VOLUMES



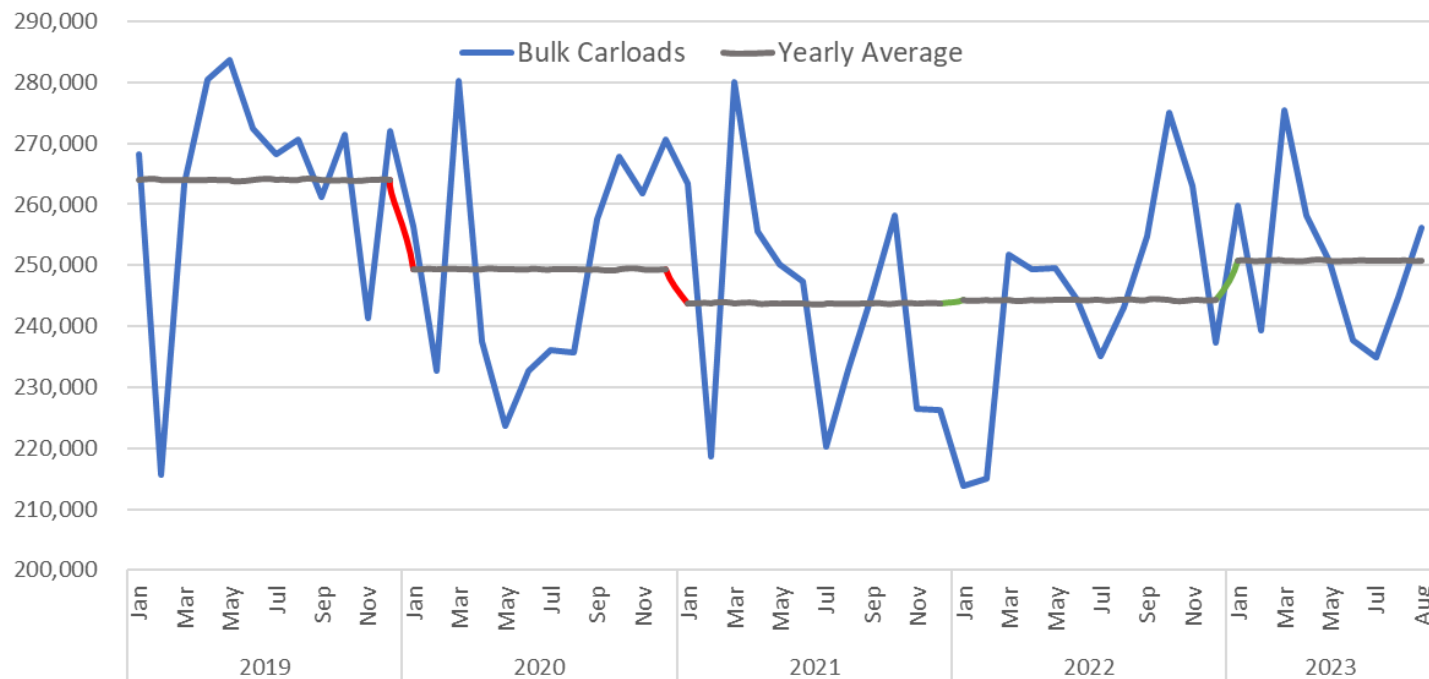
Canadian Rail Container % Change (YTD September 2023 vs 2022)



- Rail containerized cargo volumes have been experiencing declines for a majority of 2023, mainly driven by declines of imports through west coast and east coast ports.

# Despite slowdown in global and domestic economy, demand remains strong for certain bulk commodities

Canadian Bulk Rail Traffic (Carloads)



2023 Year-to-Date Canadian Bulk Rail Traffic

Commodity	Cumulative YTD	Avg/month	vs. Prev year	vs. Prior 3 years
Grain	357,783	39,753	33.1%	-0.4%
Petroleum Products	309,408	34,378	-7.4%	-1.1%
Metals & Minerals	305,781	33,975	1.8%	5.7%
Coal	293,710	32,634	3.3%	12.3%
Chemicals	235,518	26,168	2.4%	1.1%
Forestry	210,665	23,407	-5.7%	-7.6%
Automotive	209,271	23,252	15.4%	22.7%
Potash	173,944	19,327	-2.7%	-0.4%
Agricultural	110,592	12,288	10.4%	7.8%
Other Carloads	56,455	6,272	2.5%	1.4%
<b>Total Carloads</b>	<b>2,263,127</b>	<b>251,454</b>	<b>4.9%</b>	<b>3.5%</b>

- Grain volumes recovered well following a smaller crop size in 2021/22, as performance is on pace with the 3-year average. However, the current 2023/24 crop-year size is smaller, grain shipments are expected to be lower during Q4 compared to 2022.
- Coal continues to grow annually, up 12% over the prior 3-years, of which 95% has been destined for overseas markets through west coast ports.





# Although improving, global and domestic transportation performance has remained volatile across supply chain segments

- The IMF estimates that global **commodity market volatility** has doubled over the past 3 years vs the previous 3 decades.
- Post-pandemic, work stoppages and the impact of natural disaster/extreme weather events have generated increased volatility for all segment of the supply chain.
- Where marine and rail interface at **ports continues** to be the **most volatile segment** of the supply chain.

## End-to-end Supply Chain Variability by Segment – Percent change month-to-month

Container Transit Time Shanghai to Toronto via CAN West Coast

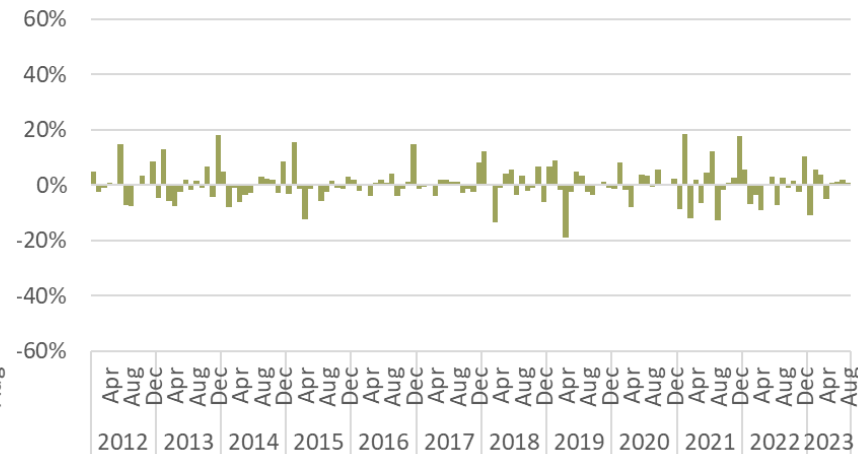
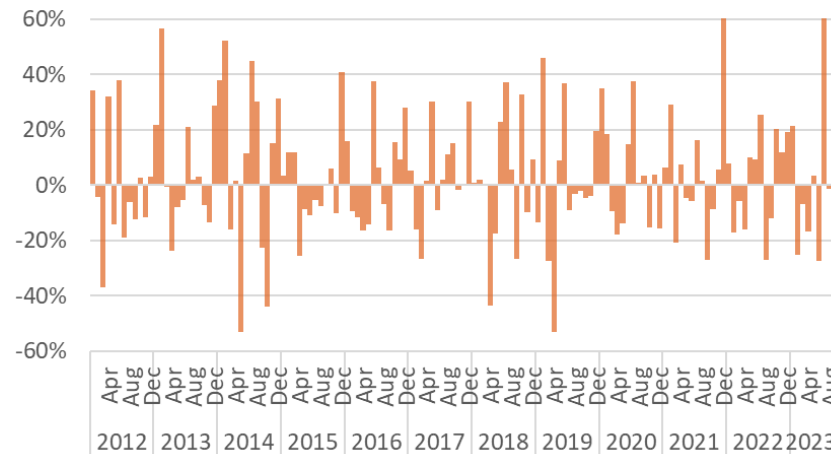
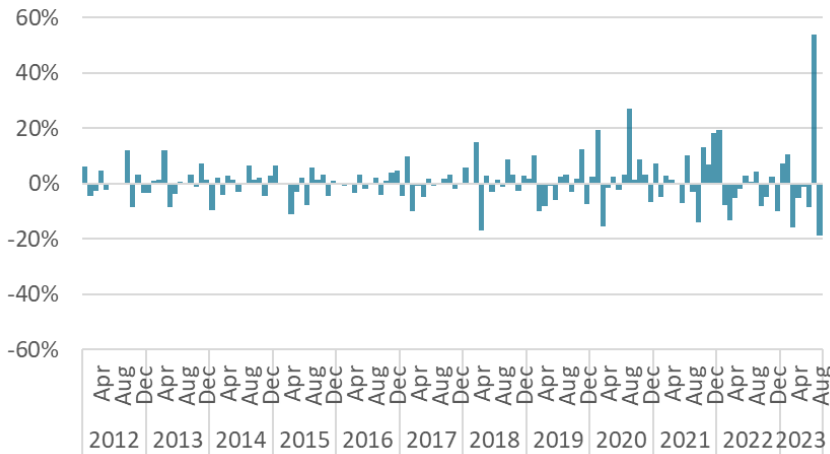
Sources: VFPA, PRPA, CN, CPKC, Transport Canada



Marine

Port

Rail



# Supply chains performance have been hindered by a series of disruptions over the summer and structural factors, amid lower volumes

Despite volumes significantly easing, performance has not fully come back to pre-pandemic levels

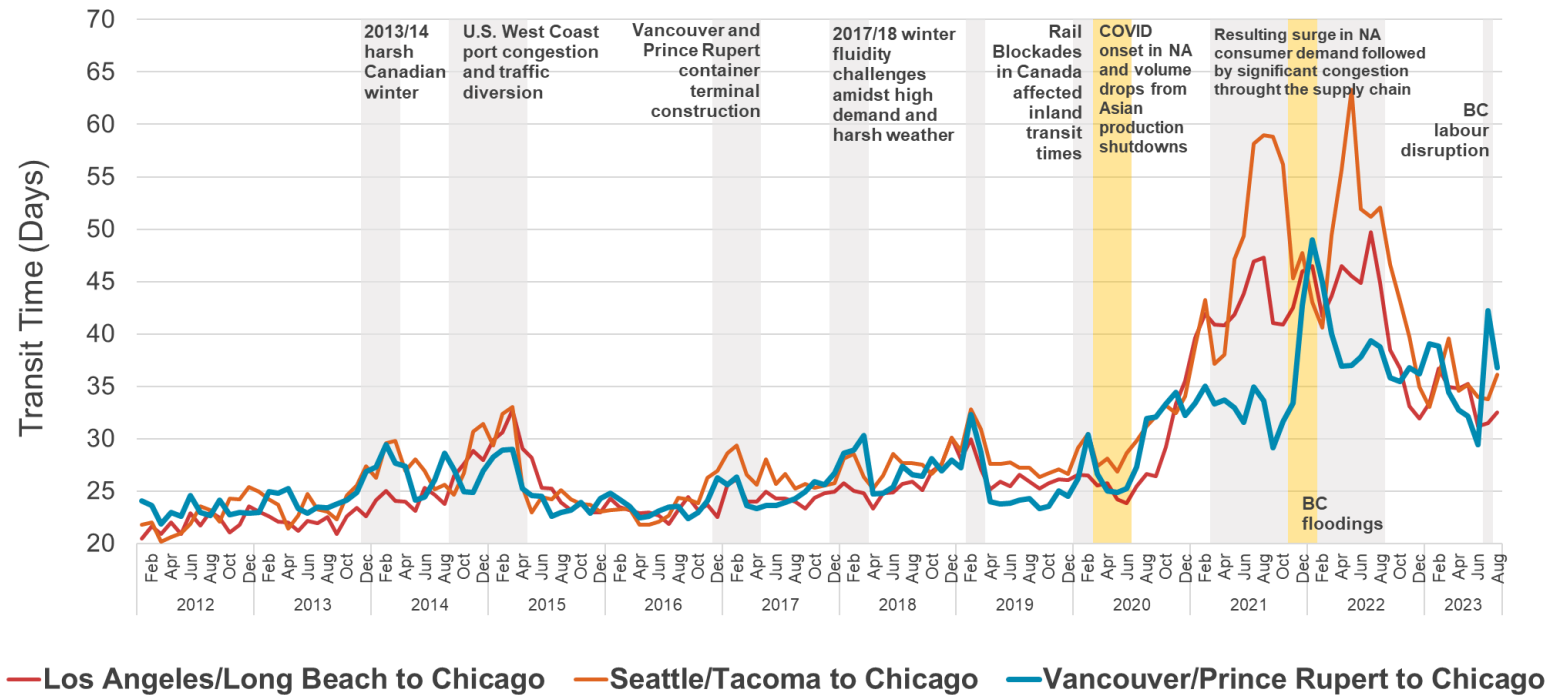
## Transitory factors

- The strike at the **BC Ports** in July 2023 impacted the movement of cargo valued at around \$10 billion, significantly impacting Canadian supply chains.
- **Wildfires** throughout the summer in many regions of Canada led to the shutdown of companies and disrupted rail traffic (10% slower in August).

## Structural factors

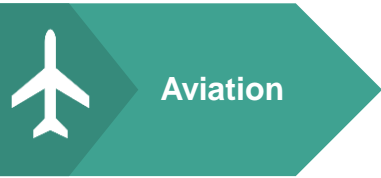
- Increased **marine transit** time due to:
  - Slow steaming to manage over capacity
  - Loss of connectivity on the BC west coast with fewer direct and 1 stop voyages to Canada
- High **dwell** remains, with volatility in volumes discharged and increased inventories on dock.

### End-to-End Container Transit Time: Shanghai to Chicago via Western Ports



Sources: Vancouver Fraser Port Authority, Prince Rupert Port Authority, CN Rail, CP Rail, Transport Canada, Cargosmart

# Passenger traffic has recorded strong increases so far in 2023, nearing a return to pre-pandemic levels



- Air passenger volume in June 2023 **was up 14%** over the same month in 2022, but was **7% below** the pre-pandemic level from June 2019



- VIA Rail ridership in July 2023 was **9% higher** than the same month in 2022, but **remains 10% below** the pre-pandemic level observed in July 2019

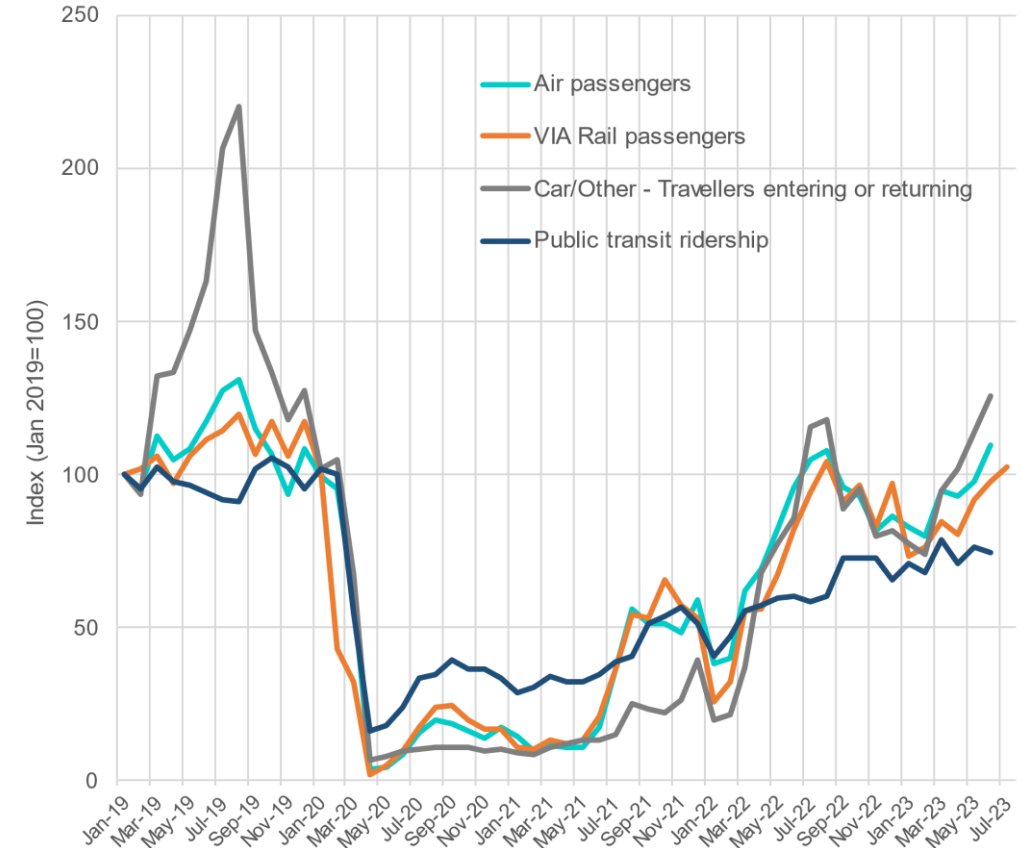


- The number of travelers entering Canada by passenger vehicle in June 2023 **was up 47%** over the same month in 2022, but was **still 23% below** the pre-pandemic level from June 2019



- Public transit ridership was **23% higher** in June 2023 than in June 2022, however growth has lagged behind the intercity travel modes and **remains 21% below** pre-pandemic level from June 2019.

Passenger Volumes by Mode,  
Index (Jan 2019 = 100)

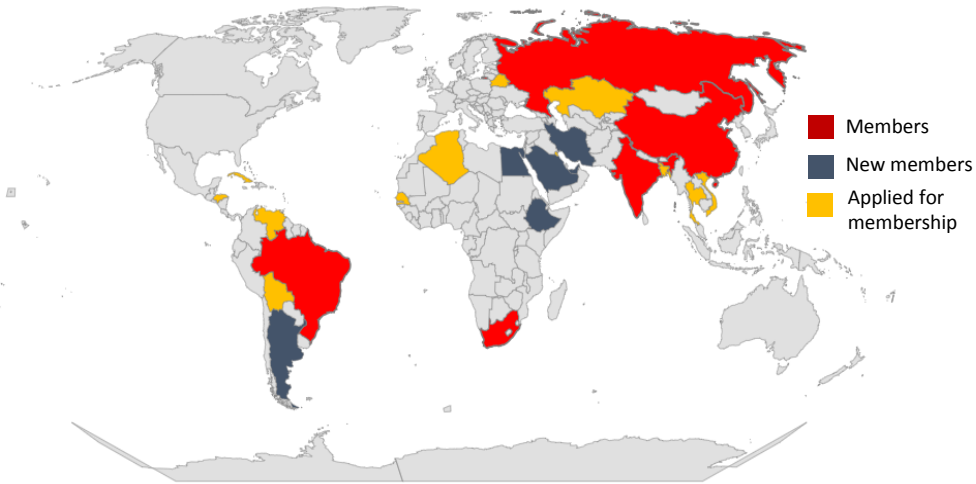


Sources: Statistics Canada Tables 23-10-0251-01 & 24-10-0053-01, VIA Rail, Enplaned/Deplaned air passengers ECATS



# Geopolitical uncertainties will lead to more volatility but also create new economic opportunities

Expansion of BRICS



## Geopolitics

Emerging geopolitical context remains a key driver of **global volatility**

- **Rise of middle-income** countries has resulted in alternative institutions (BRICS+, Asian Development Bank etc.)
- Ongoing **war in Ukraine** and uncertainty in the Middle-East may further disrupt trade
- Western countries have responded to challenges through **private sector nearshoring** and **public sector policies** (sanctions, CHIPS Act, etc.)



## Commodities

Geopolitical challenges have **translated into volatility for key commodities:**

- Global supply shortfall owing in part to conflict in Ukraine is driving demand for **Canadian grain**
- Overseas shipment of **potash** to be challenged by Belarus and Russia claiming market share by circumventing shipping sanctions
- Economic ties within BRICS+ has the potential to change trade patterns of **crude oil** in the Middle East

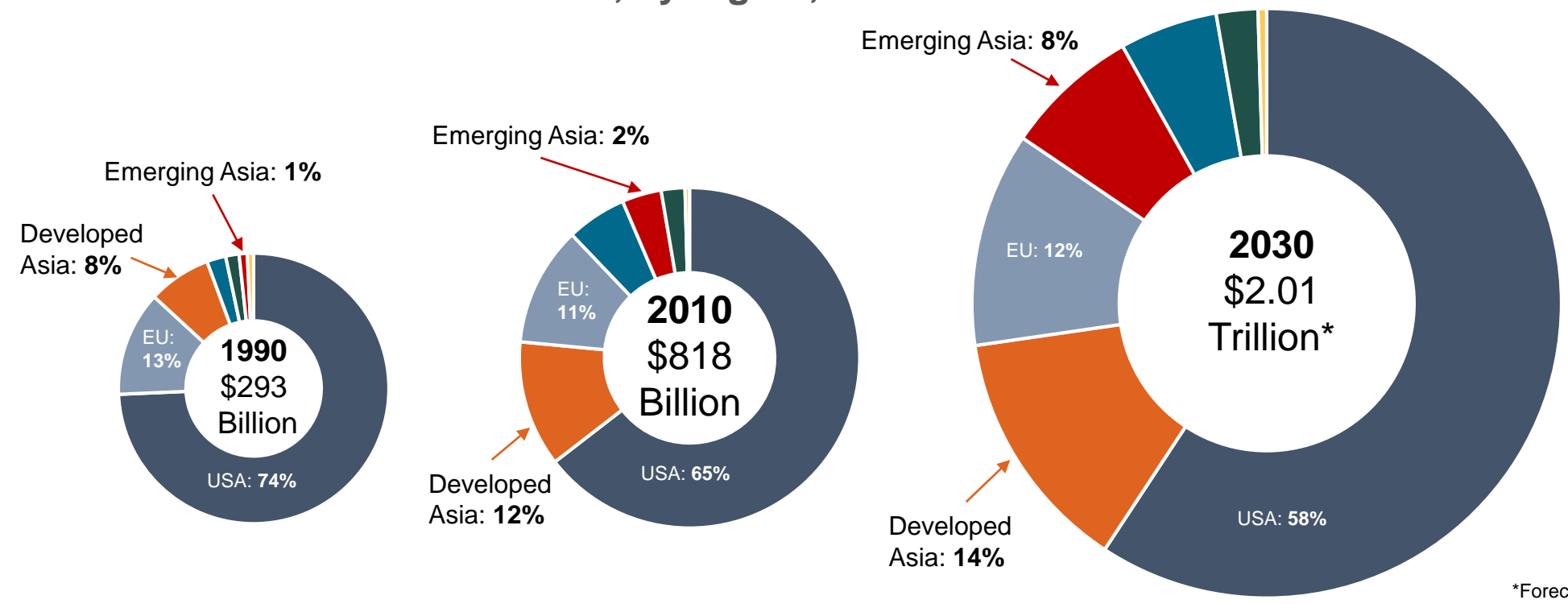
National Rail and Marine Network Outlook



# Canadian trade will continue to grow and shift towards emerging markets

Canadian trade, by region, nominal

- United States
- Europe
- Developed Asia
- Central and South America
- Africa and Middle East
- Emerging Asia



\*Forecasted data



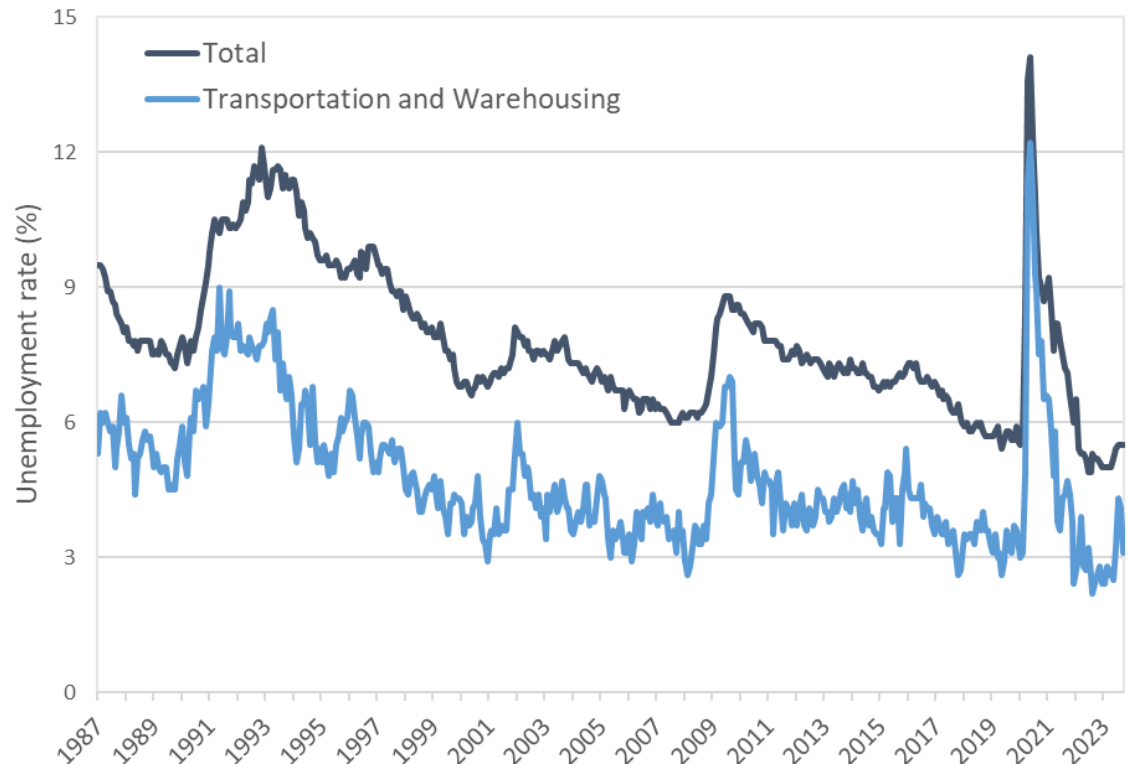
- Trade has shifted away from our biggest trade partner. Resulting in greater diversification of trade relationships with Asian countries
  - Asia as a share of total trade is expected shift from 8% in 1990 to 22% in 2030
- Nonetheless, the United States will remain Canada's largest trading partner

Source: Statistics Canada, Oxford Economics

# The transportation sector capacity is limited by a tight domestic labour market

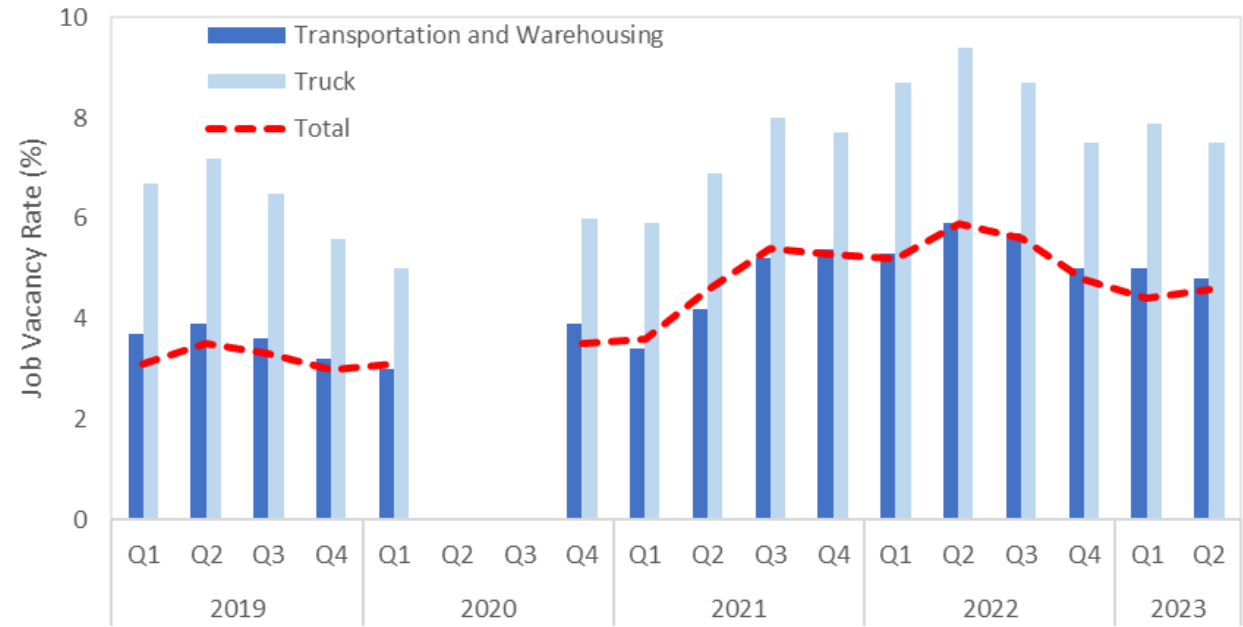
- There are clear **signs of tightness** in the transportation labour market
  - Lower than average **unemployment rate** (3.1% in the transportation sector in September 2023, compared to 5.5% for all industries)
  - High **job vacancy rate** for specific transportation sub-sectors such as truck transportation (7.5% in Q2 2023 compared to 4.6% for all industries)

Unemployment Rate (by Industry)



Source: Statistics Canada Table 14-10-0291-01

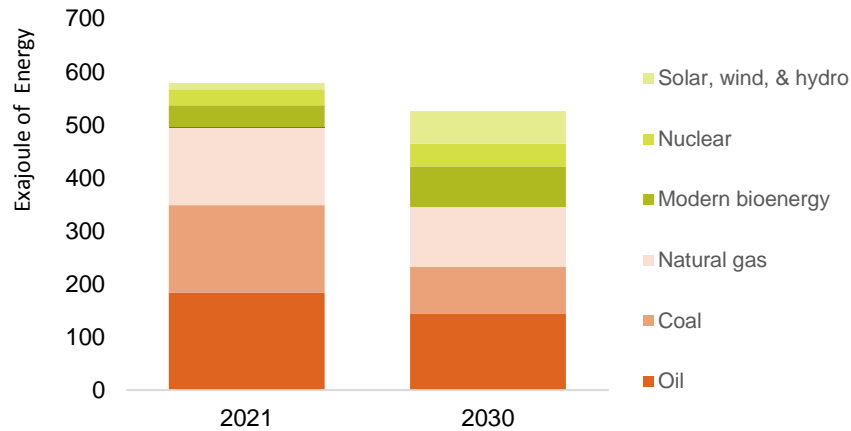
Job Vacancy Rate (by Industry)



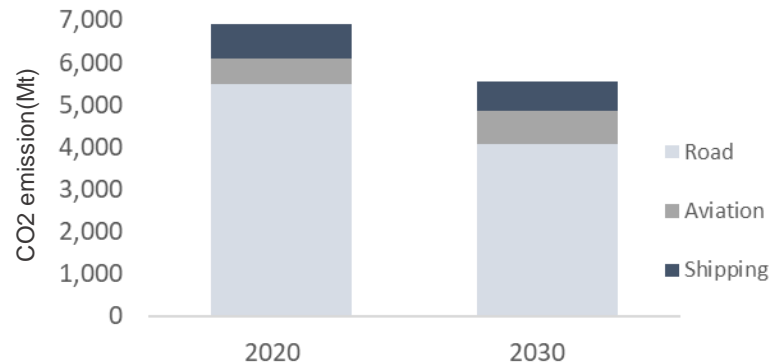
Source: Statistics Canada Table 14-10-0326-01

# Energy transition and climate change will lead to realignment of the network

World Energy Supply



World CO2 Emissions by Transportation Mode



## Industrial Transition

Global response to climate change is driving **demand growth for key commodities** (hydrogen, battery electric vehicles, critical minerals, etc.)

- While high emissions **commodities decline** (crude, gas, coal)



## Transportation Energy Transition

The **transportation sector** will also need to adapt to keep pace with social expectations for a **greener supply-chains** (IMO regulations, Corporate Climate Action Plans)



## Climate Change

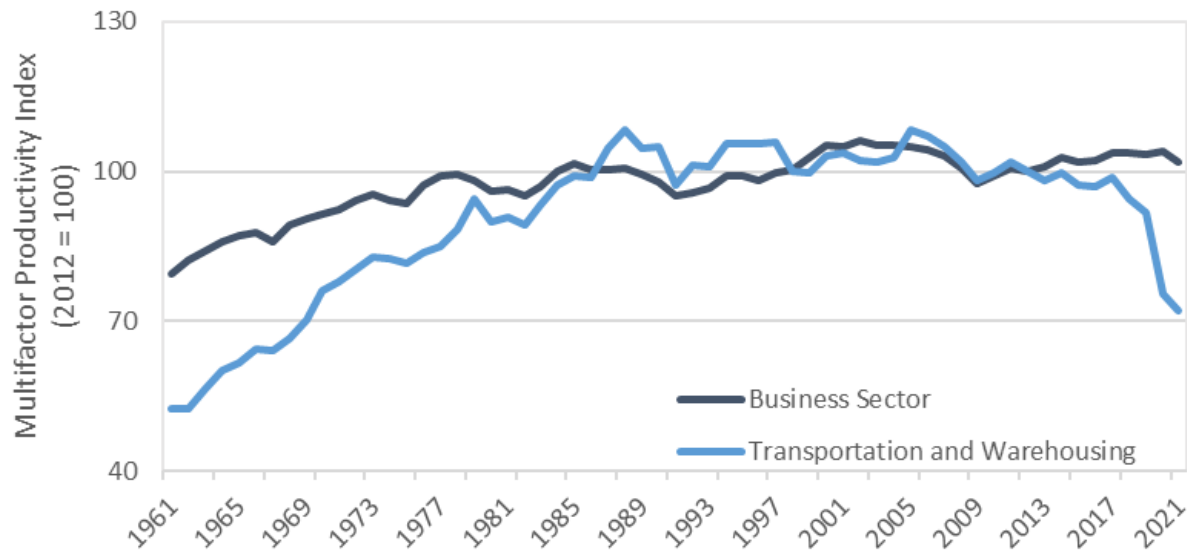
Climate change and extreme weather events will increasingly contribute towards losses in capacity and volatility in demand

- More frequent events such as wildfires or floods will lead to losses in crop production and rail network disruptions

# Productivity and competitiveness have been weak over the past 5 years

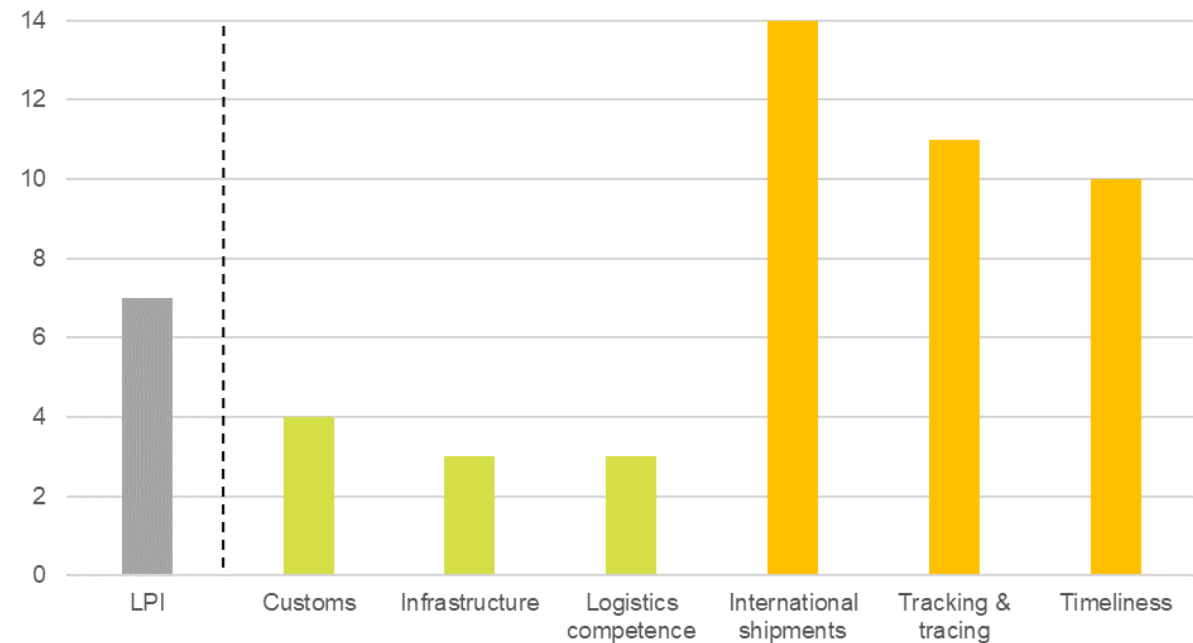
- Multifactor productivity in the transportation sector **grew considerably** from the **early 1960s to the late 1980s**.
- Productivity plateaued from the early **1990s to the 2008-09 recessions**, and **declined** afterwards – in 2021, it was almost 30% lower than a decade earlier.
- While Canada fares generally well in the World Bank's Logistics Performance Index, it also **lags global leaders** in terms of timeliness, pricing of international of shipments, and ability to track and trace shipments.

Multifactor Productivity Index 1961-2021 (by industry)



Source: Statistics Canada Table 36-10-0208-01

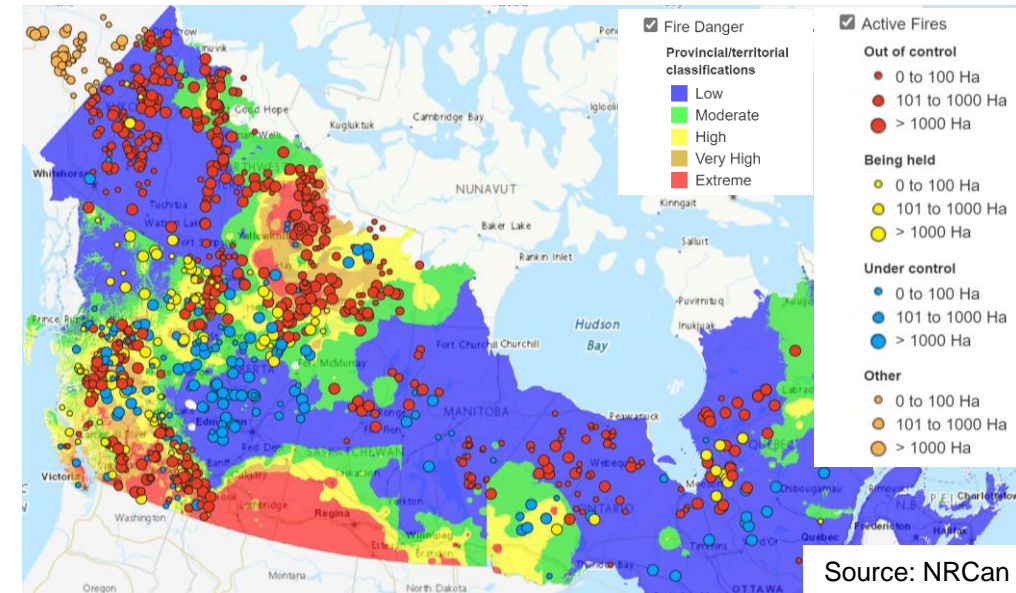
Canada Logistics Performance Index 2023 Ranking





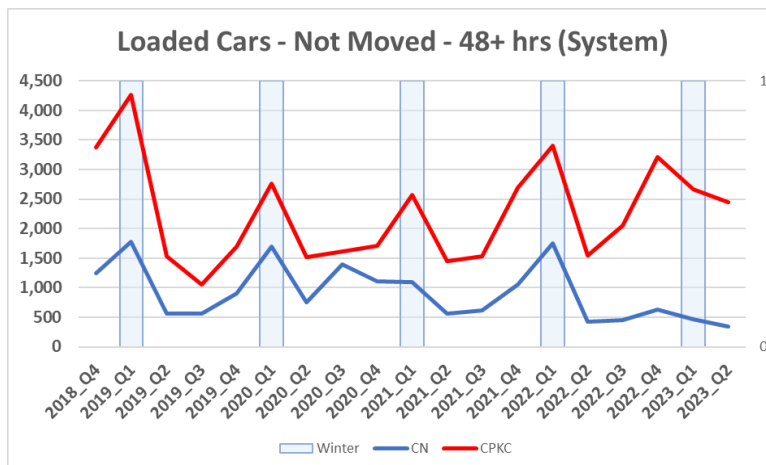
# The Canadian transportation network will continue to face uncertainty and potential disruptions

Map: Canadian wildfires, August 18th 2023



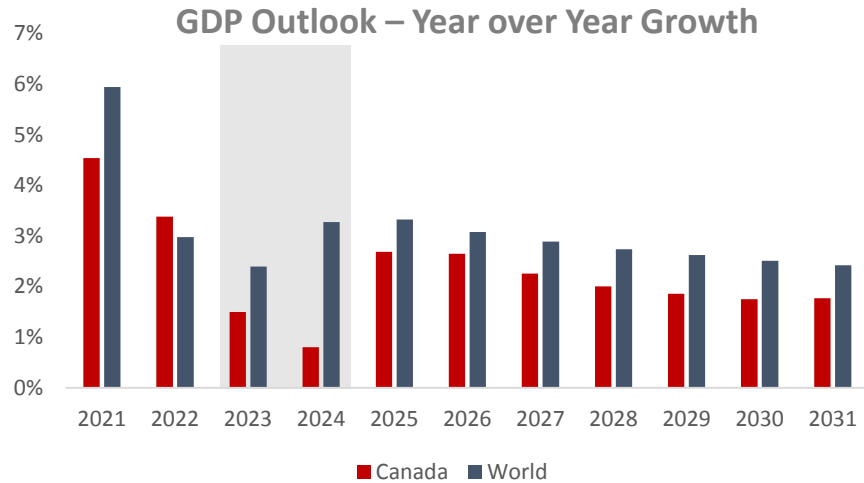
- **Global and domestic uncertainty** will continue to hinder Canada's transportation system efficiency
  - Geo-political tensions and war may reshape trade patterns.
  - High inflation has been increasing the frequency of **work stoppages** as workers want to protect their purchasing power.
  - Intensification of **extreme weather events** will increase in frequency, amplifying the risk of disruptions.
- **Severe winter weather** reduces the network capacity and reduces fluidity (e.g., reduces train length and speed).

## Key transportation collective agreements

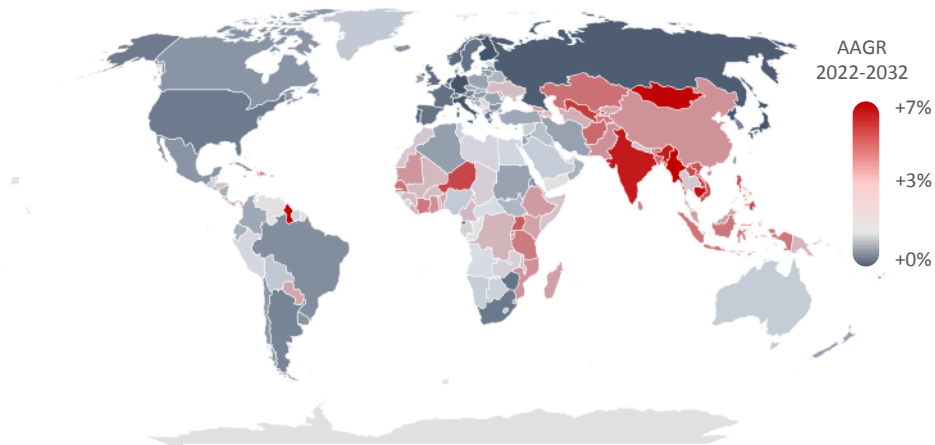


Company	Occupation Group	Volume Moved	Expiration Date
CN	6,000 Conductors, rail engineers, etc.	goods valued at \$400M/day	December 31, 2023
CPKC	3,200 rail and yard locomotive engineers	goods valued at \$260M/day	December 31, 2023
Port of Montréal	Over 1,000 longshore workers	goods valued at \$100M/day	December 31, 2023
Air Canada	4,500 pilots	34M passengers/year	September 30, 2023
Air Transat	2100 cabin crew for in-flight service	3.9M passengers/year	October 31, 2023

# Over the long-term, emerging markets will be the engine of growth – leading production and demand for resources...



**World Average Annual GDP Growth to 2032**



## Short-Term Outlook

2023-2024

Monetary policy tightening contributed to a **deceleration** of the Canadian Outlook.

- **Consumption** and **imports** are expected to slow as monetary tightening weighs on debt-sensitive households and governments reduce COVID stimulus.
- **Resource exports** are expected to see some resilience owing to China reopening and global resource shortages resulting from conflict in Ukraine
- **Manufacturing exports** to slow owing to global monetary tightening, balanced by benefits from alleviation of supply shortages for inputs.

As in Canada, monetary tightening is central to the downward trend for most global economies.



## Long-Term Outlook

2022-2032

**Asia** will continue to be the **engine of global growth**, although at a slower rate

- Growth will shift from China to **emerging markets** (ex: India, Vietnam, etc..)

Consequently, emerging markets will be Canada's fastest **growing source of trade**. Although, the US and China will remain significant trade partners.

Canadian economy will be challenged by limited population gains – with an increasing reliance on **immigration to support labour force growth**

# Current commodity market trends are expected to continue into 2024



Natural resources will continue to experience both ongoing **disruption** and **opportunities** from the **Ukraine conflict**



Cyclically sensitive commodities will experience **headwinds** from **monetary tightening**

Short-term Canadian Commodity Market Growth Outlook vs History AAGR					
Commodity	Outlook 2023-2024		History 2021-2023		Outlook Vs. History
Iron Ore	+5%	New mines & capacity in QC	+0%	Capacity limitations	↑
Coal	+5%	China stimulus spending and strong automotive demand	+5%	Rebound in coal consumption following pandemic balanced by inventory shortfall in China	=
Crude Oil	+3%	Completion of Trans-Mountain expansion and new crude-by-rail methods increase export capacity	-15%	Decreased global travel and economic output. New technology increase shipment density	↑
Grain	+3%	Global supply shortfall driving solid demand	-10%	Weak harvest	↑
Automotive	+2%	Supply chain shortage loosening but consumer demand softening	+3%	Chip shortages and supply-chain bottlenecks	↓
Wood Products	+2%	Recovery from recent low but rising interest rates	+0%	Logistics challenges and concern of housing recession	↑
Containers	+1%	Consumer demand cools as economy weakens	+2%	Pent up demand balanced by supply challenges	↓
Chemical Products	+0%	High fertilizer prices and slowing industrial activity	-2%	Fertilizer use offset decline in pandemic industrial use	↑
Potash	+0%	Depleted US soil nutrition levels and Russia/Belarus export challenges	+1%	High overseas inventory and high prices resulting in purchase hesitancy	↓
Pulp and Paper	+0%	Digitalization and weak economic conditions	-5%	Logistics challenges and reduced office printing	↑
Refined Energy Products	+0%	New capacity balanced by cooling economy	+10%	New terminal capacity	↓

\* % change of trade volume (individual units vary by commodity)

Source: Oxford Economics, Wood Mackenzie, Commodities Research Unit, Forest Economic Advisors, LMC Automotive, Pulp and Paper Products Council, Food and Agriculture Organization, Hackett Maritime

# Long-term commodity demand growth is expected to stabilize while adapting to global transitions...



Grain, chemical fertilizers, potash will remain amongst the **top growing commodities**



**Industrial transition:** slowing urbanization and population growth in Asia coupled with **climate change** initiatives will weigh on demand of key commodities

Long-term Commodity Market Growth* Outlook vs History AAGR					
Commodity		Outlook 10 Year		History 10 Year	Outlook vs. History
Potash	+5%	New mine and captured market share from Russia and Belarus	+10%	Market share gain - Break up of Russian producer cartel	↓
Grain	+3%	Solid yield and animal feed demand growth	+3%	Solid yield and population growth	=
Chemicals	+3%	Solid Canadian fertilizer use & development of hydrogen	+3%	Solid Canadian fertilizer & industrial use	=
Containers	+2%	Shift in consumer spending outweighed by rising incomes	+5%	Rising incomes and capture market share from US ports	↓
Coal	+2%	Green energy & reduced China infrastructure investment	+5%	Market slowing but capture market share from US ports	↓
Wood Products	+2%	Limits on tree cutting owing to pests and fires	+3%	Higher forest cut limits	↓
Refined Energy Products	+1%	New terminal but capacity remains limited	∞	Emergence of energy by rail	N/A
Iron Ore	+1%	China moving to consumer-oriented economy	+5%	Market share and urbanization/industrialization in Asia	↓
Crude Oil	+1%	Limited investment owing to transition to renewable energy	∞	Emergence of crude by rail	N/A
Automotive	+1%	Shift to more expensive and more durable green vehicles	+0%	North American production losing market share	↑
Pulp and Paper	+0%	Digitalization and environmental considerations	-3%	Shift to digital media	↑

**Source:** Oxford Economics, Wood Mackenzie, Commodities Research Unit, Forest Economic Advisors, LMC Automotive, Pulp and Paper Products Council, Food and Agriculture Organization, Hackett Maritime

# Key risks and areas of uncertainty may result in capacity misalignment with transportation demand...



## Under Capacity (supply < demand)

- Lost opportunities as transportation system is unable to keep pace with industry and regional growth
- Congestion at ports and transportation network
- Reduced competitiveness of Canadian economy



## Over Capacity (supply > demand)

- Increased commodity prices to recoup investment in infrastructure
- Discourage future investments



## Misalignment

- Combined implications of over and under capacity (reduced competitiveness and higher transportation costs)

Slow project approvals

US port challenges: trade diversion to Canada

U.S. policy: demand for Canadian resources

Monetary easing

Economic downturn

Energy transition

US port improvements: Canada loses market share

Trade wars or sanctions

Extreme weather events

Opportunities from emerging markets

Reshoring: impact on international corridors

# Opportunities for the Canadian transportation network to better mitigate risks...



## Coordination

Harmonizing of future projects and activities and enabling real-time asset coordination for **increased visibility** of the network to industry



## Optimization

Introduction of **new technologies** (artificial intelligence) for optimization of corridors and delivery



## Facilitation

Providing soft infrastructure services to further industry growth through partnerships with international organizations or **trade agreements**

# The economic context reinforces the importance of better visibility, coordination and planning across the supply chain

- Experiences around the world (e.g., Singapore, Rotterdam) show that digitalization of transportation supply chains translates into significant benefits:
  - **Better coordination** of activities and **capacity planning** across the supply chain;
  - More **resilience** of the transportation system to shocks (e.g., natural disasters, strikes at key facilities);
  - **Lower logistics costs** for shippers;
  - **Competitive advantage** over less digitalized countries;
  - **Lower GHG emissions**.
- To keep up with global leaders, Canada needs to **accelerate digitalization** of its transportation supply chain to increase visibility, coordination and planning.
- TC is called to play an essential role in **convening stakeholders** around digitalization and **supporting** this process. Work has already started with:



Launch of Advancing Industry-Driven Digitalization of Canada's Supply Chain initiative



Creation of a National Supply Chain Office (NSCO)



National Trade Corridor Fund Digital Call



Legislative framework to underpin data-sharing



- Digitalization will require **public-private sector collaboration and investments**.

# ... along with the need to explore innovations that can further enhance visibility, optimization and resilience



## New technologies:

- **Artificial intelligence** unlocking automation and optimization applications.
- **Quantum** computing and **cloud** technologies enabling faster big data processing.

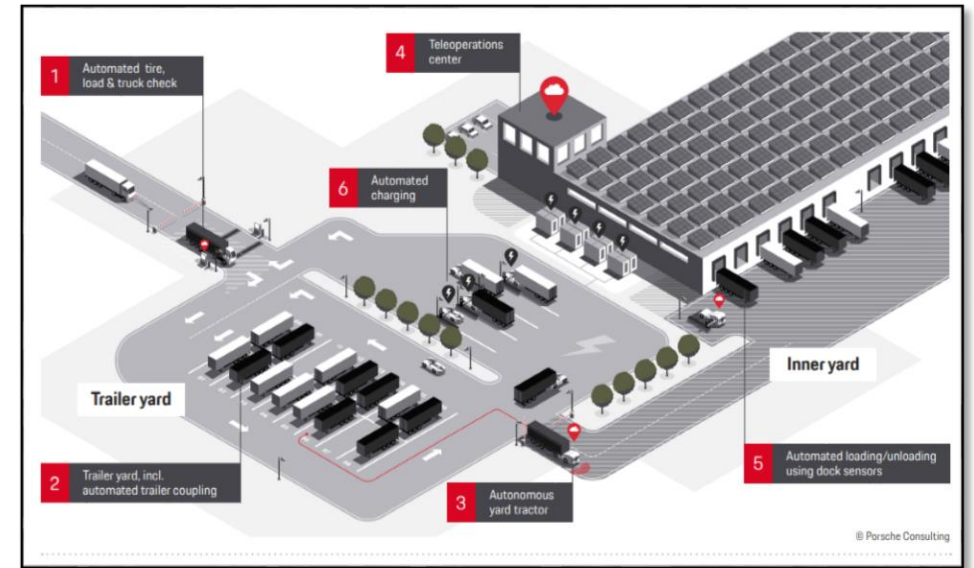
## Increased connectivity:

- Technology-enabled data collection (e.g., **sensors**) and “**Internet of things**” enabling real-time asset coordination.
- **5G** and **blockchain** technologies accelerating and securing sensitive data transfers.

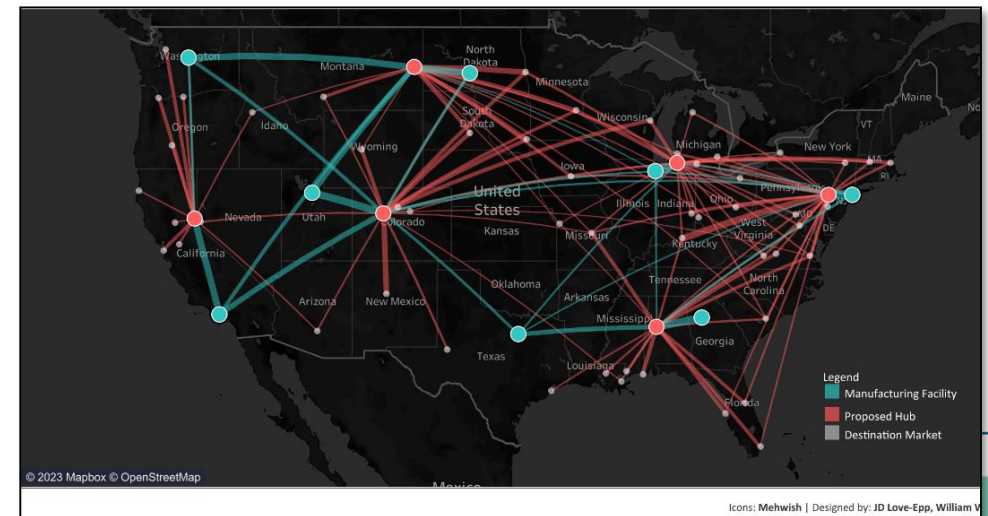
## Opportunities to develop smart logistics hubs

- Fully-automated **logistics hubs** to optimize operations.
- **Digital twins** to manage inventories and transport activities and simulate responses to disruptions.
- Advanced **predictive analytics** to increase visibility, supply chain resilience and cargo routing optimization.

02/11/2023



Above: Visual representation of a fully-automated logistics hub.





# Conclusion

- Post pandemic, **weaker economic conditions** are translating into lower demand for imports; demand for Canadian bulk exports remains sustained.
- Despite lower demand, **performance** of the transportation system is not back to pre-pandemic levels amid global uncertainty and high volatility.
- Looking ahead, renewal of key collective agreements, combined with increasing occurrence of extreme climate events will pose challenges to supply chain competitiveness
- The shift away from Canada's our biggest trade partners to emerging Asian countries, will require to have a reliable, fluid and competitive transportation system in order to seize these **economic opportunities**.
- The economic context reinforces the importance of better **coordination, collaboration and visibility across** the supply chain along with the need to explore innovations that can further enhance performance, optimization and resilience