

# Cost of Compliance with Carbon Regulations for Canada's Rail and Truck Sectors

*Based on work conducted for the Railway  
Association of Canada  
November 20, 2017*



*credit: CN Rail*



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FORTUNE  
**100 FIRMS**

# Some of Delphi's Recent Clients



# Study Objectives & Outcomes

**A**

**Analysis**

Existing Policies

- Carbon Tax
- Carbon Levy
- Cap + Trade

**F**

**Forecasts**

Compliance costs

- Jurisdiction
- Carrier type

**P**

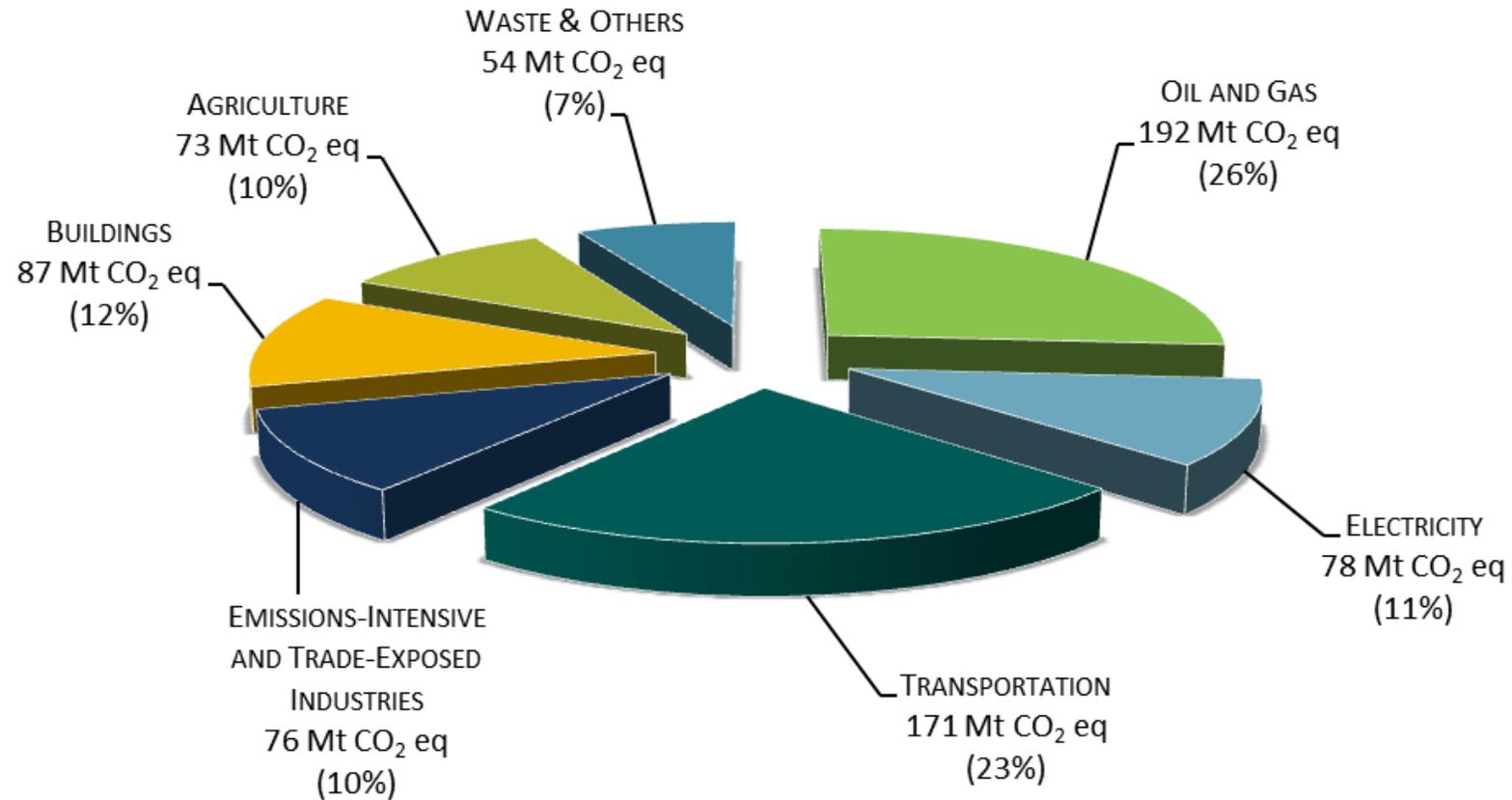
**New Policies**

Implication of  
Clean Fuel  
Standard

# Key Caveats

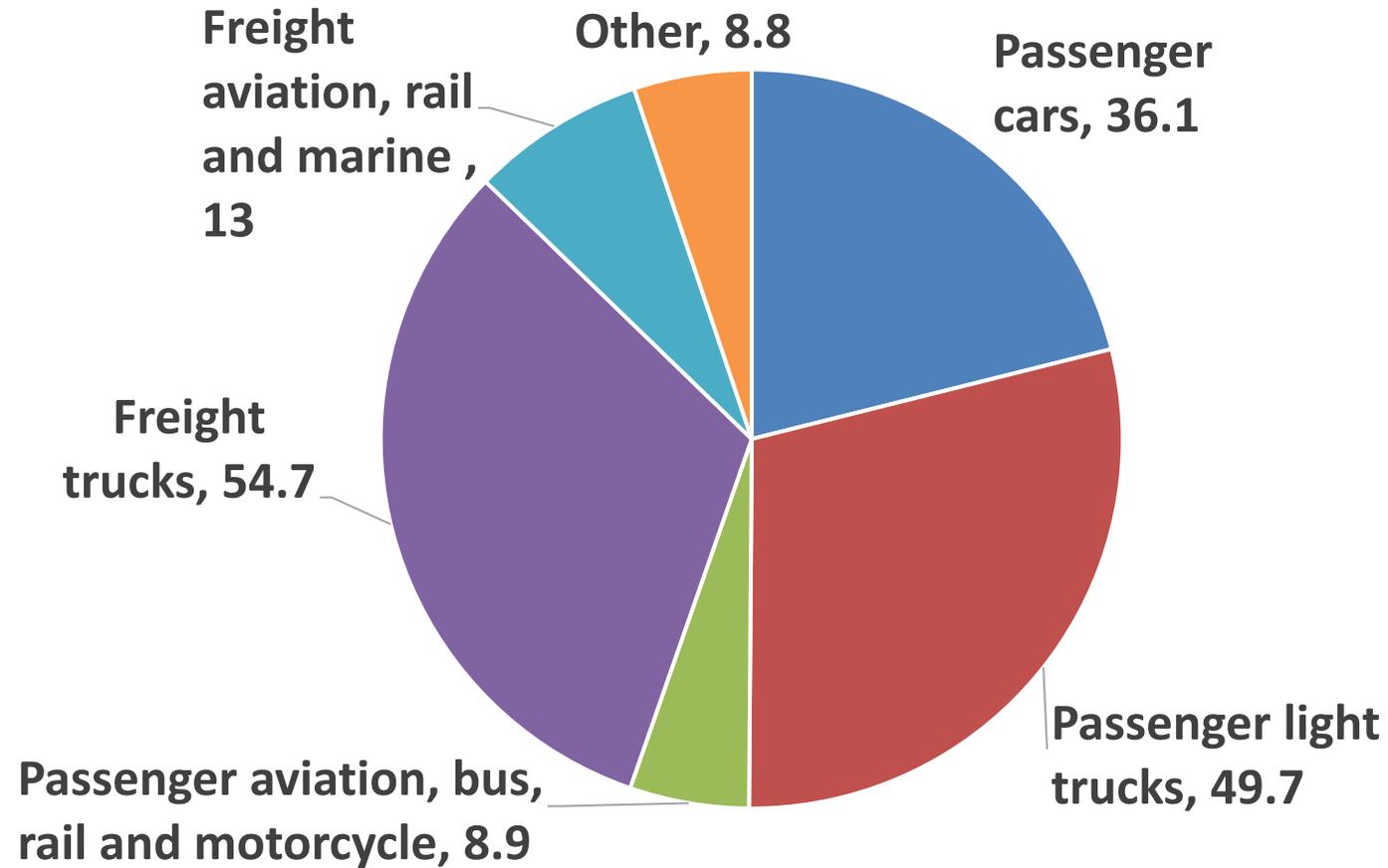
1. Study was conducted for the Railway Association of Canada, who provided and reviewed rail fuel consumption. Truck fuel consumption was taken from government sources and results are unreviewed by members of the trucking industry
2. Analysis is from early 2017 and does not include more recently evolving policy.
3. Costs are meant to be indicative, as they are based on assumptions and speculation. At the time of the study, very few details were available on the Canadian CFS.

# Transportation in Context



GHGs by Economic Sector from Canada's Inventory Report 1990-2014

# Transportation



# Methodology

- Fuel consumption estimated in each province
  - Rail provided by RAC
  - Truck energy use by province extracted from NRCan's National Energy Use Database (2014) and converted to diesel for medium and heavy trucks (all trucks gross weight > 3,856kg)
- Carbon price and CFS costs estimated per L diesel
  - Terminology: carbon price means carbon tax, carbon levy and cap and trade.
- Fuel consumption X cost per L = total cost

# Assumptions Made in Analysis

## 1) Government Policies

- In 2017 4 jurisdictions had carbon-pricing mechanisms
  - BC and AB = carbon tax
  - ON and QC = cap and trade
- Federal Government announced mandate for Pan-Canadian carbon-pricing
  - Minimum price of \$10/tCO<sub>2e</sub> in 2018, rising to \$50/tCO<sub>2e</sub> in 2022
  - Cap and trade schemes must show “equivalency” of outcomes, but will not be subject to the backstop

# Assumptions Made in Analysis (cont'd)

## 2) Federal Clean Fuel Standard (CFS) will be similar to BC's Low Carbon Fuel Standard

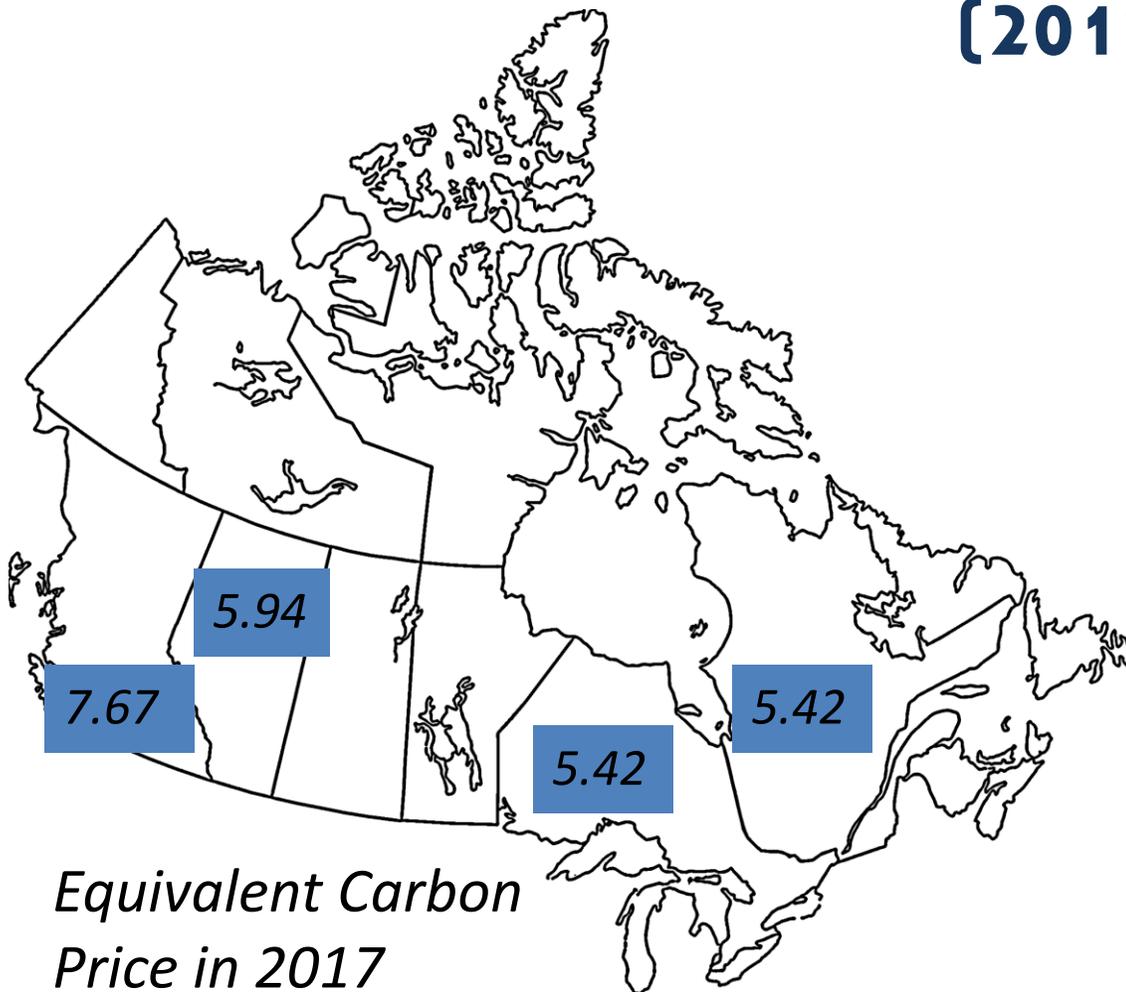
- Will mandate a carbon intensity per unit of fossil fuels, reaching a 10% CI reduction by 2022
  - This is aggressive – recent work commissioned by Clean Energy Canada was based on a 5% CI reduction in 2020, 8% reduction in 2025 and 12.5% reduction in 2030
- CFS credit price will be \$171/tCO<sub>2e</sub> and credit purchase will provide an indicative cost (i.e. alternate fuel production costs were not estimated)

## 3) Assumptions in following analysis:

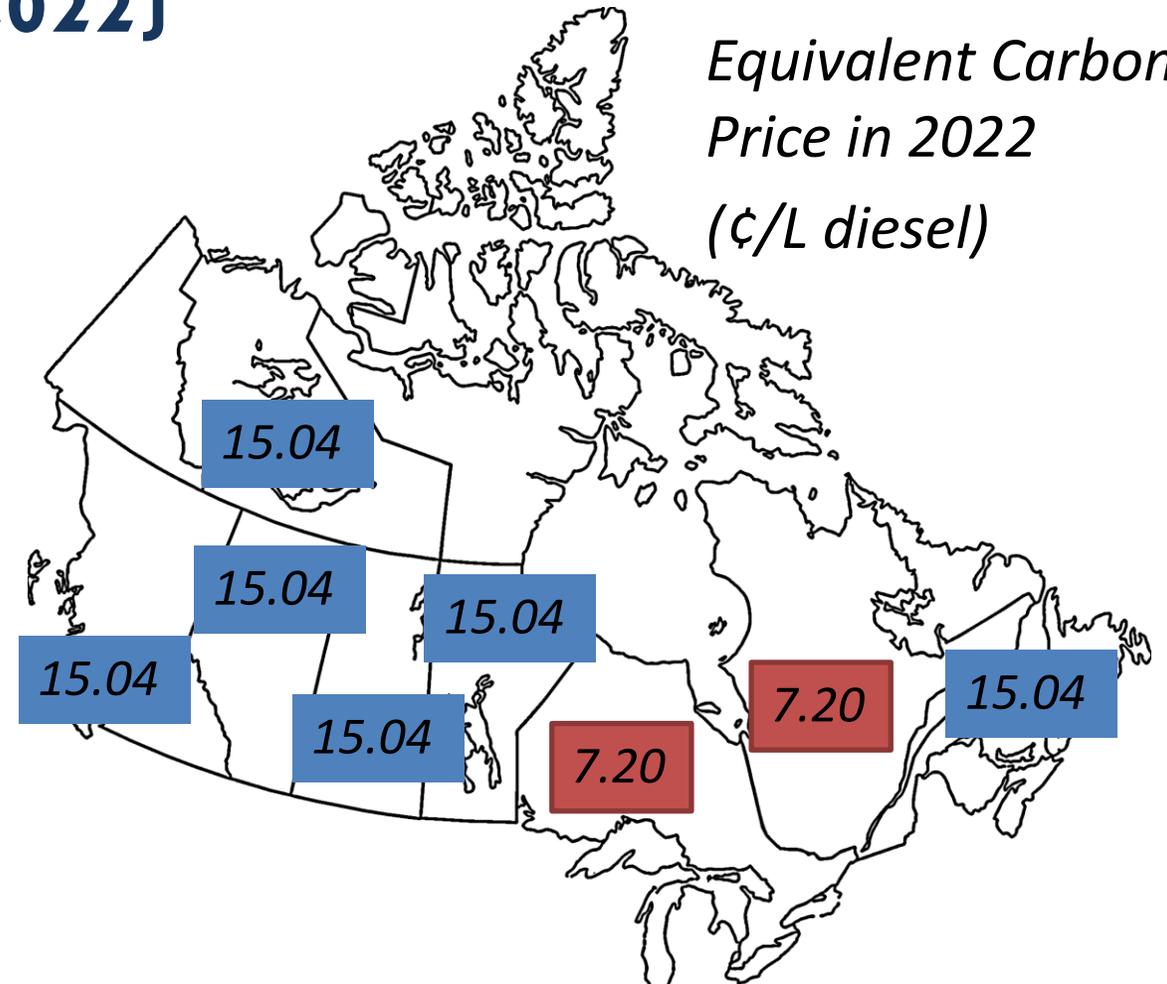
- In BC and AB, federal carbon price floor overlaid on existing levies
- In ON and QC, carbon prices were back-calculated from allowance costs in the Western Climate Initiative (QC is currently a member, ON will join)
- Federal price floor adopted for jurisdictions where there is a lack of clear carbon pricing information
  - Recent announcements by MB, BC and NS have not been included

# Carbon Price Impact on Diesel Fuel Costs

(2017-2022)



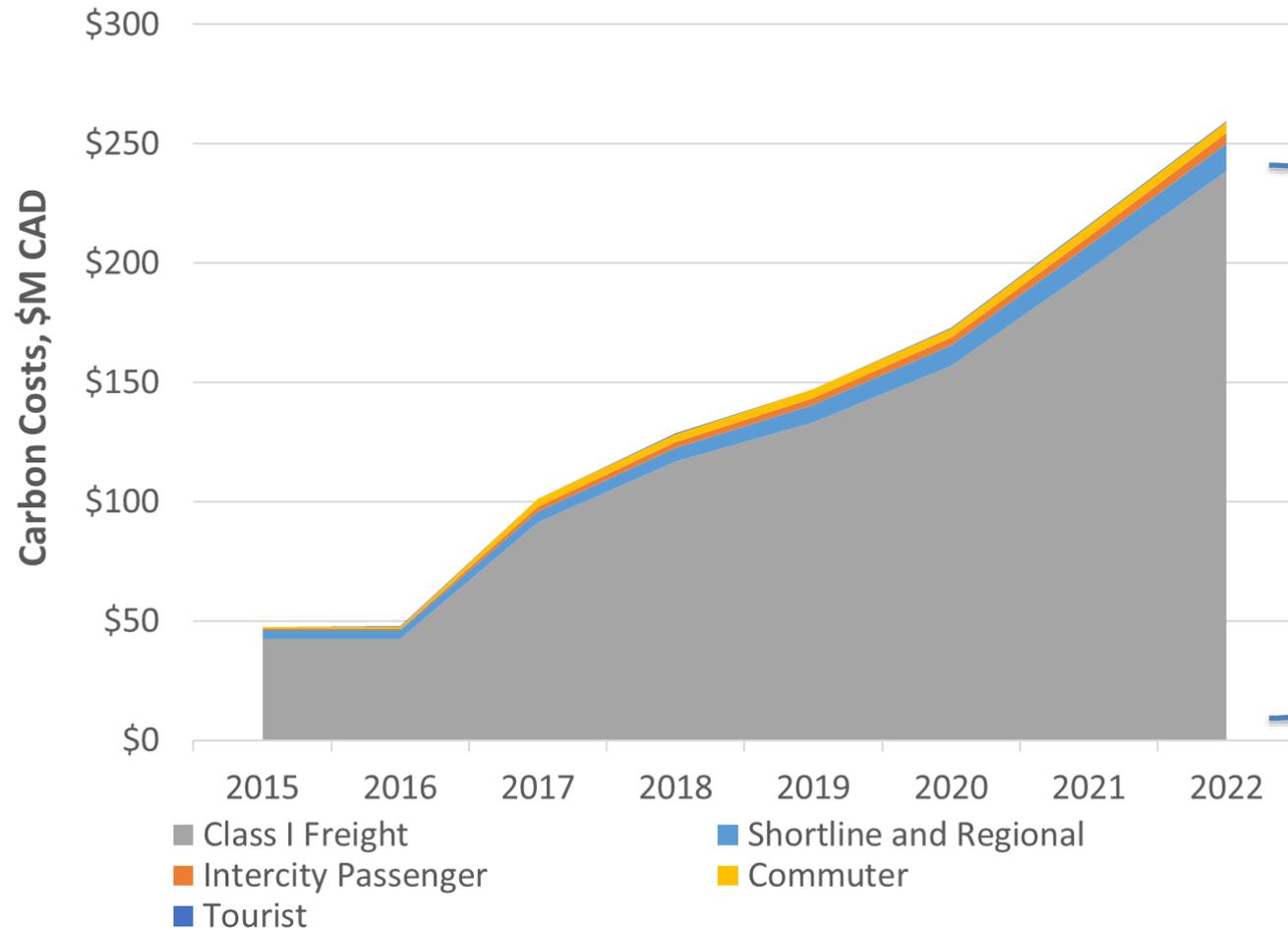
*Equivalent Carbon Price in 2017 (¢/L diesel)*



*Equivalent Carbon Price in 2022 (¢/L diesel)*

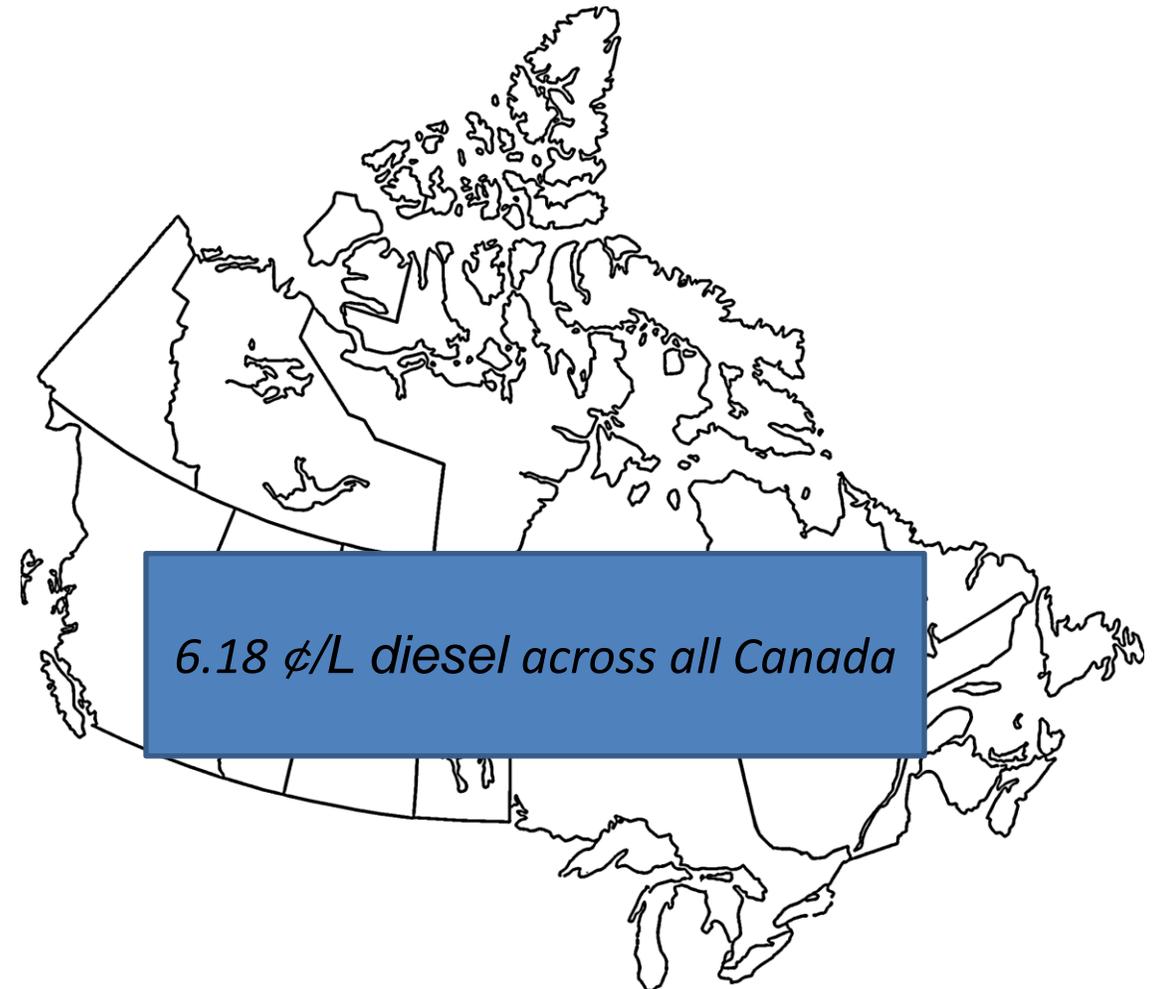
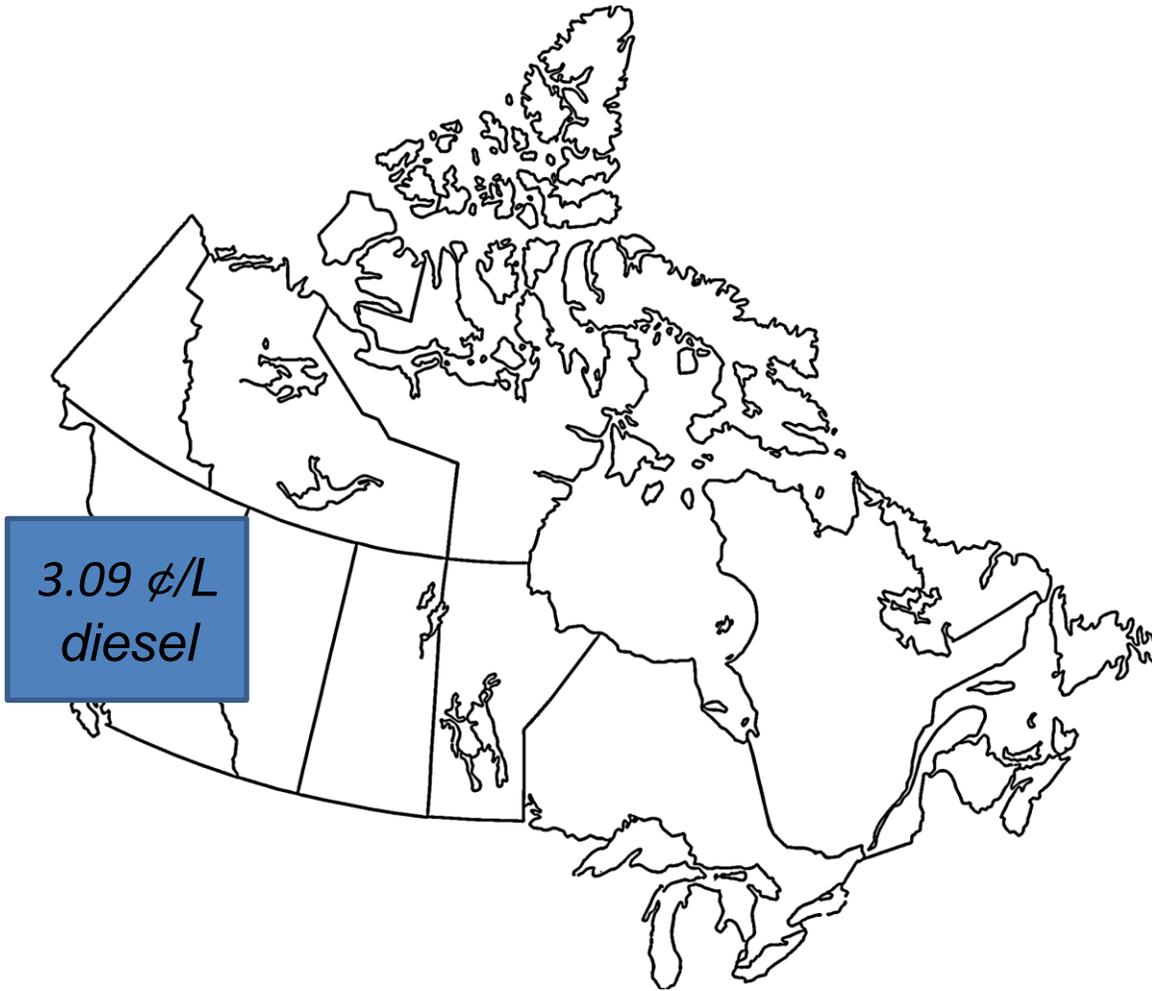
*\*2022 levy rate 13.69¢/L in the federal carbon pricing backstop technical paper*

# Carbon Price Costs for Rail by Carrier Type

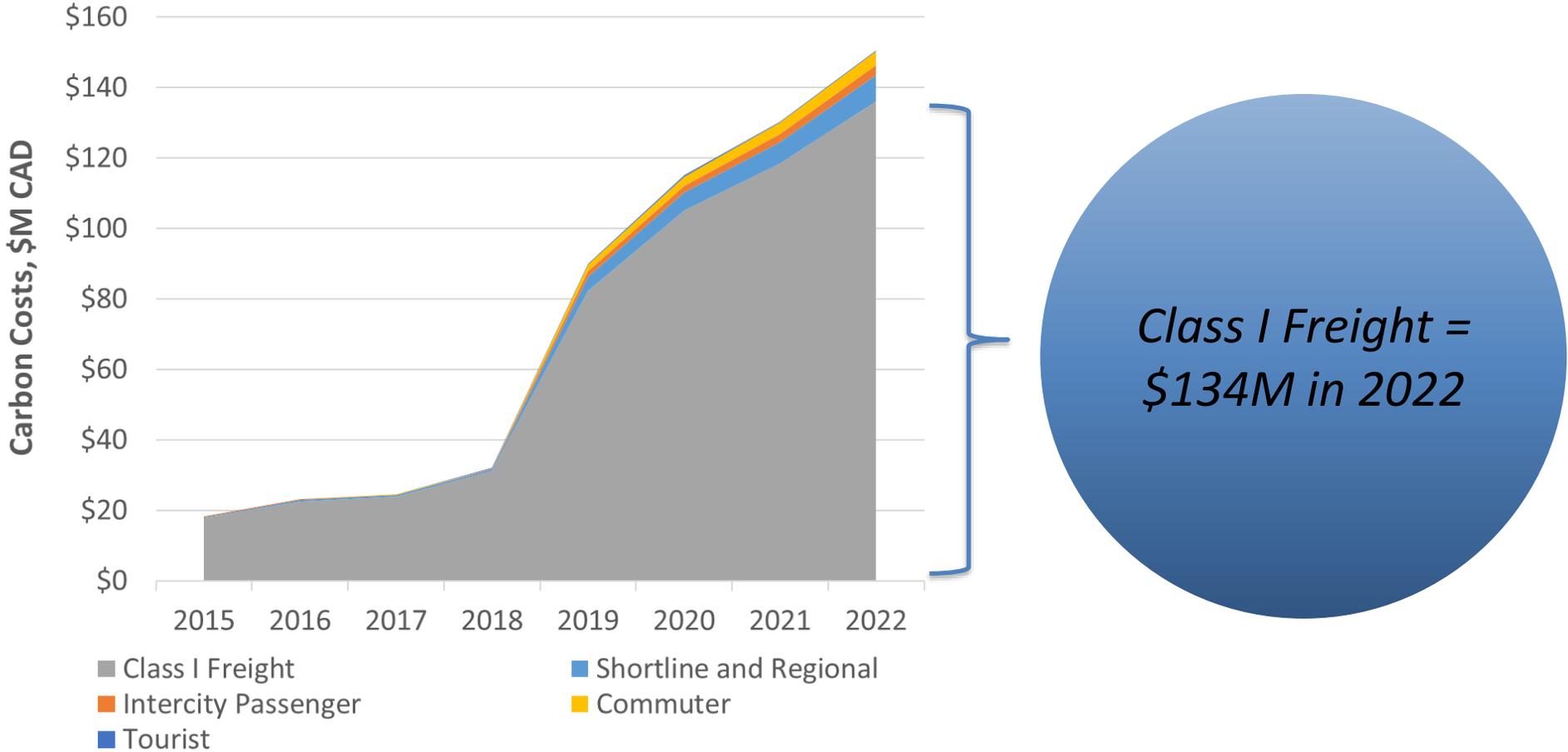


*Class I Freight =  
233M in 2022*

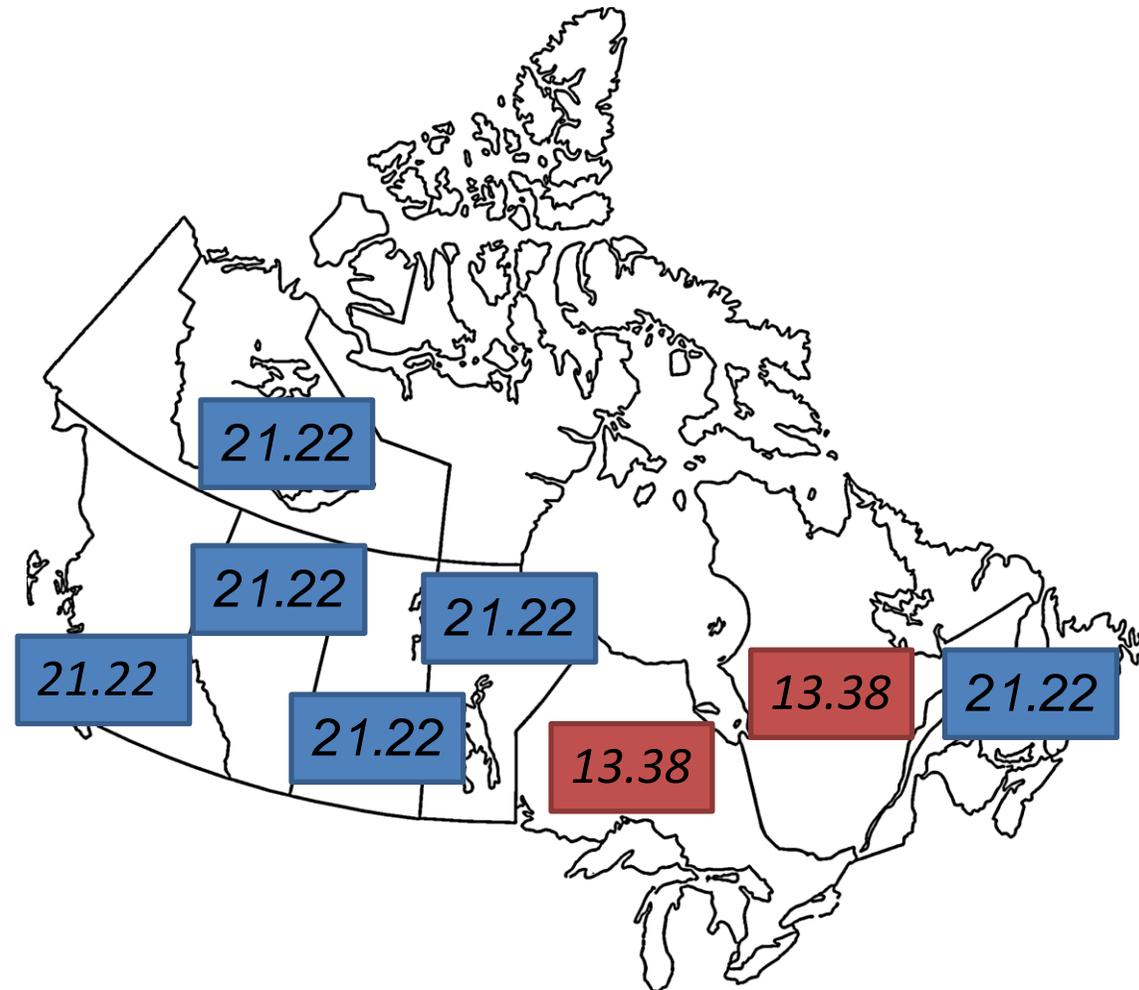
# CFS Impact on Diesel Fuel Costs (2017-2022)



# CFS Costs for Rail by Carrier type

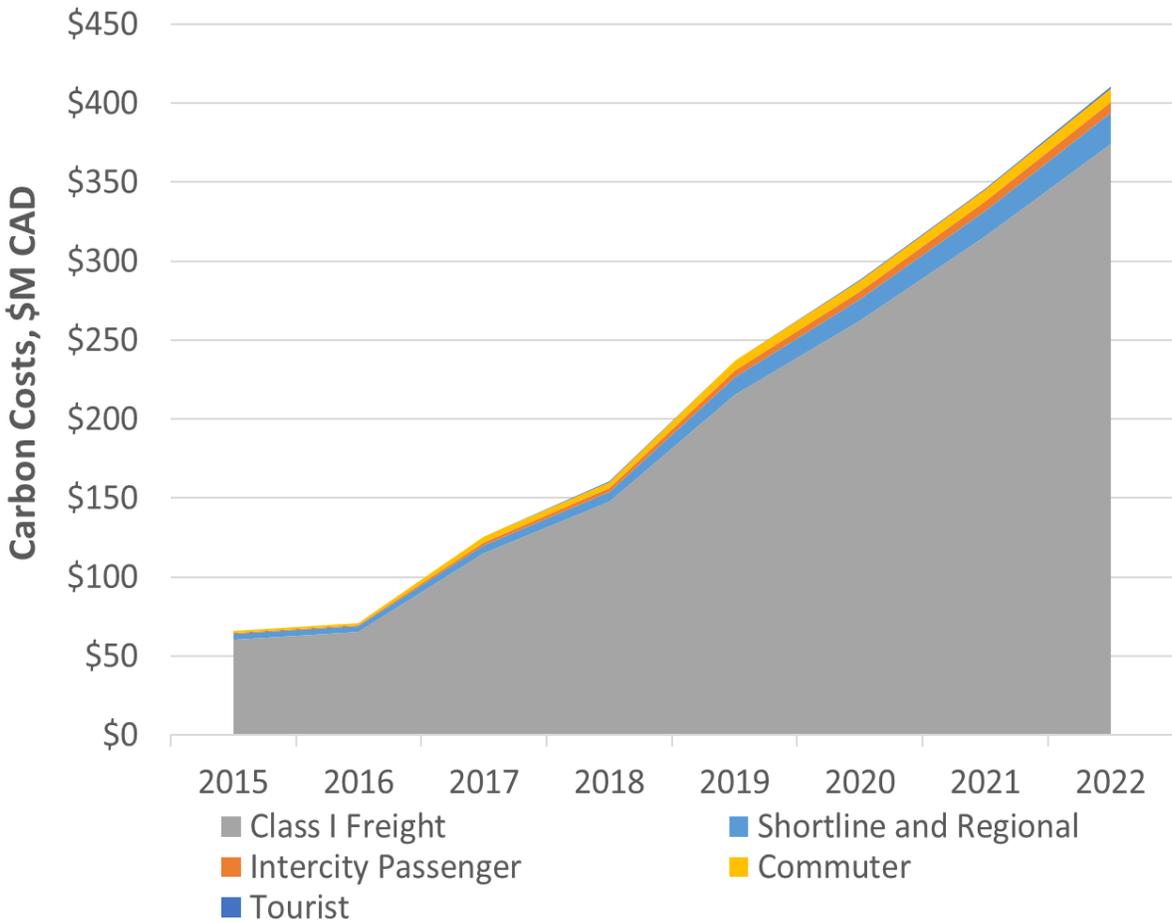


# Carbon Price and CFS Impact on Diesel Fuel Costs (2017-2022)



*Cumulative emissions  
policy costs in 2022  
(¢/L diesel)*

# Carbon Price and LCFS Costs for Rail by Carrier type



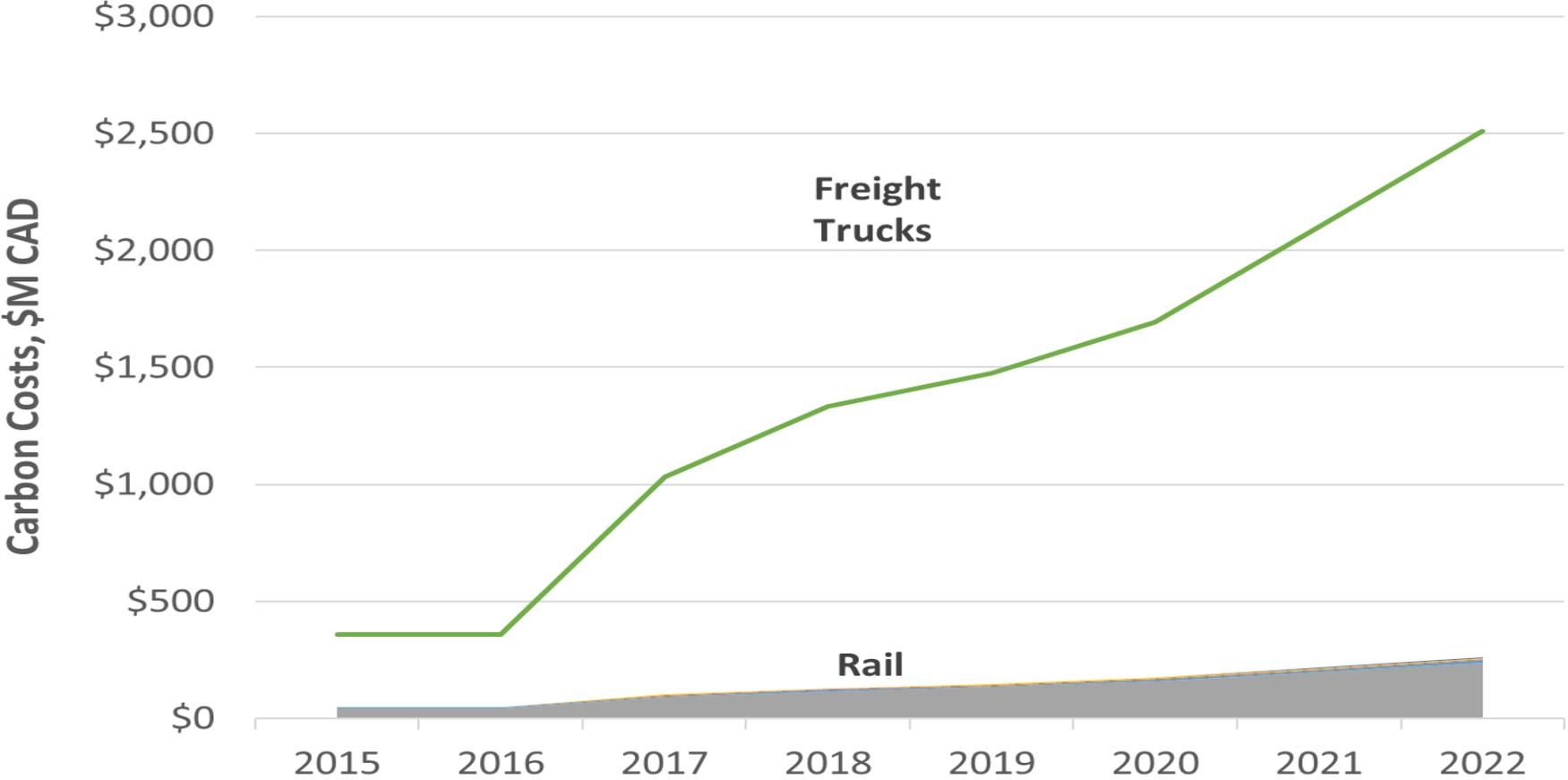
*Cumulative costs are on the order of \$1.54B by 2022*

# Rail and Truck Fuel Consumption

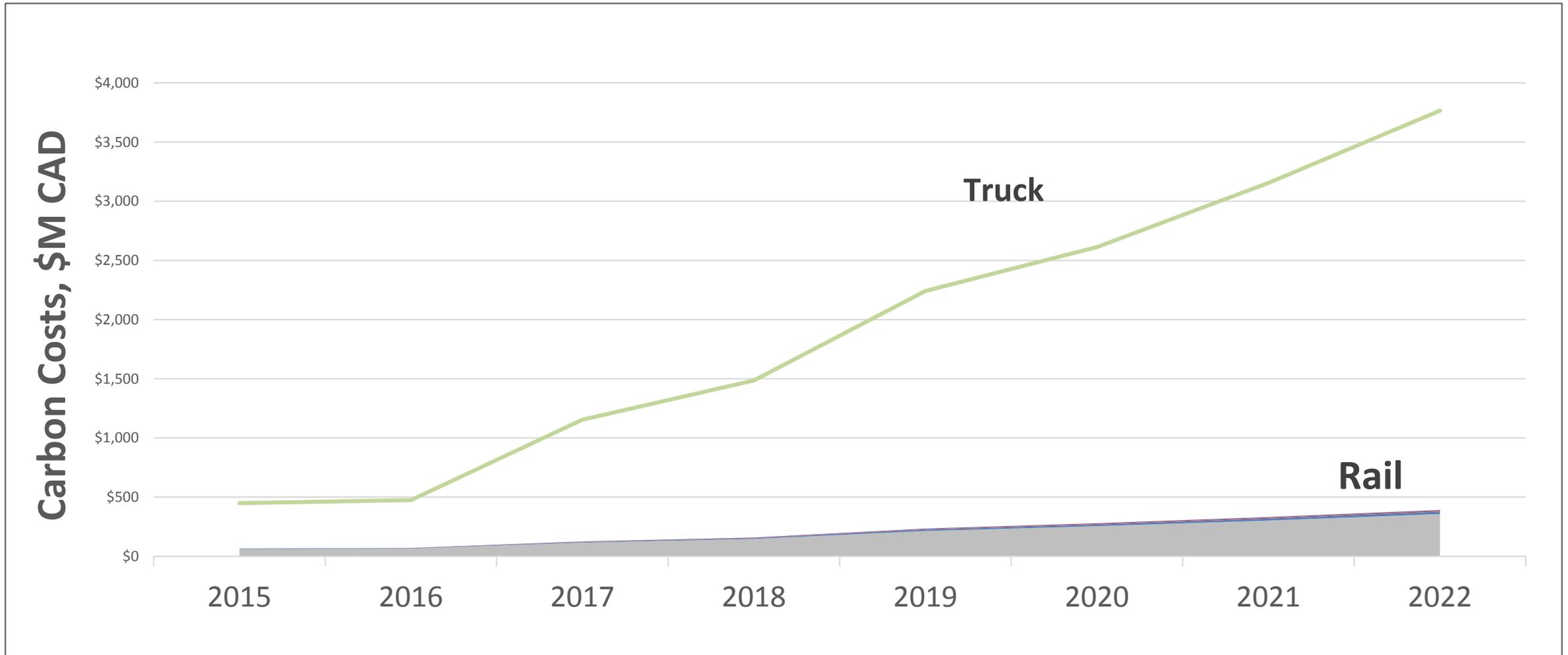
(1000 L)

Province	Rail	Truck
Alberta	314,792	6,457,027
British Columbia	518,705	2,590,481
Manitoba	177,497	676,203
Newfoundland & Labrador	16,118	290,740
New Brunswick	35,689	391,487
Nova Scotia	10,454	425,598
Ontario	631,065	5,858,502
Quebec	151,720	3,133,214
Saskatchewan	268,737	1,553,498
Northwest Territories	189	
Yukon	171	
Segments Terminating in the US*	10,860	
<b>Total</b>	<b>2,135,997</b>	<b>21,376,750</b>

# Carbon Price Costs - Rail and Truck



# Carbon Price and CFS Costs – Rail and Truck



# Questions?

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