



CHECK ENGINE LIGHT:

Climate Policy Overheats Transportation Costs in Canada

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INTRODUCTION

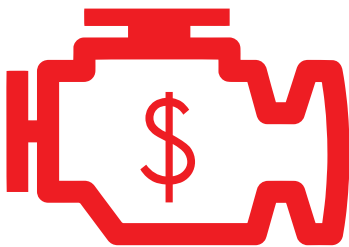
The Government of Canada has declared meeting its commitments under the United Nation's Paris Agreement as one of its highest policy priorities.

In 2016, the federal government established the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) with the intent of reducing Canadian greenhouse gas (GHG) emissions by 30% below 2005 levels by the year 2030.

Much of the debate about the PCF has focused on the inclusion of a carbon pricing regime. There is a strong consensus among economists that carbon pricing is the most efficient way to reduce GHG emissions at the lowest economic cost as it allows governments to replace inefficient regulations and costly subsidies with a clear market-based incentive.

The PCF as currently designed is much more than carbon pricing. In addition to a national carbon pricing framework, the PCF aims to introduce more than a dozen layered policies. These range from regulations and efficiency standards for emissions-intensive industries and buildings to targeted investments into electric vehicle subsidies, clean energy technology and methane capture.

As the source of over one-quarter of Canada's GHG emissions, the transportation sector faces a significant economic impact as a result of the PCF through the cumulative impact of taxes, subsidies and mandatory regulations designed to reduce GHG emissions. This report overviews some of the projected direct and indirect costs of the PCF on the movement of goods and people, with a particular focus on light and heavy road vehicles.¹ It highlights the need for flexible and reduced regulatory burdens to minimize the impact of climate policy on the competitiveness of Canada's transportation sector.



There were over 33,000 federal regulations for the transportation industry in 2018.

¹ Transport Canada, "Canada: Vehicle Definitions," TransportPolicy.net, www.transportpolicy.net/standard/canada-vehicle-definitions.



GOODS MOVEMENT IN CANADA

As a vast nation within an interconnected and globalized economy, Canada depends on the smooth and efficient movement of goods across the country.

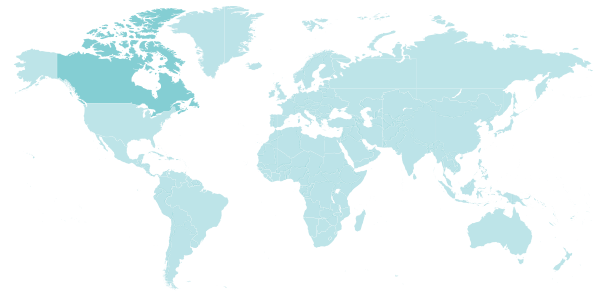
In addition to ensuring businesses can cheaply and efficiently get their products to their customers and participate in industrial supply chains and export markets, the freight sector is critical to maintaining Canadians' everyday lifestyles and consumer habits.



BY THE NUMBERS

The Canadian economy and the prosperity of Canada's citizens rely on the efficient transportation of goods.

Transportation is integral to Canada's international trade growth:



In 2017, Canada's annual **exports and imports** were valued at **\$549.6 billion** and **\$573.6 billion**, respectively.² Canada's road transportation network plays a critical role, with its share of that value ranging from **32%** in Western Canada to as high as **55%** in Central Canada. Northern and rural areas mainly rely on roads for year-round access for people and cargo.



In 2017, Canada's total **international merchandise** trade amounted to **\$1.107 billion**—a **5.4%** increase over 2016 and the highest value of total trade recorded.



In 2017, there were approximately **11 million two-way trucking movements** recorded at Canada/U.S. border points, which is the highest number of trucks crossing the border since 2008.

2 Statistics Canada, "Canadian International Merchandise Trade: Annual Review," 2017, www150.statcan.gc.ca/n1/daily-quotidien/180606/dq180606c-eng.htm.

Transportation is a growing part of the Canadian economy:



Transportation and warehousing represent **4.6%** of Canada's total gross domestic product (GDP).



In 2017, the sector grew by **4.8%** in real terms, nearly **1.5 times** the growth rate for all industries. The compound annual growth rate for **GDP in the transportation sector** over the previous five years (**3.3%**) also exceeds that of the economy as a whole (**1.9%**).



In 2017, **905,000 employees** worked in the transportation and warehousing sector, up **0.9%** from 2016. **Employment in commercial transport industries** accounts for about **5%** of total employment.

A growing population, stable economic growth, new business demand and consumer preferences will only increase the importance of transportation in the Canadian economy. While Canada is already integrated within the North American economy through the North American Free Trade Agreement (NAFTA), freight activity will continue to increase through new trade deals such as the Comprehensive and Progressive Agreement for Trans-Pacific

Partnership (CPTPP) and the Canada–European Union Comprehensive Economic and Trade Agreement (CETA), as well as ambitious export strategies for sectors like agrifood. In addition, retail consumers are showing an increased preference for ecommerce, which is expected to claim an estimated 10% of all retail sales in Canada³ by the end of 2019, with retailers like Amazon raising consumer expectations for fast and even same-day deliveries.

3 Forrester, "Forrester Data: Online Cross-Border Retail Forecast, 2017 to 2022," Apr. 2017, www.forrester.com.



GHG EMISSIONS IN THE TRANSPORTATION INDUSTRY

The most prominent target within the PCF is for Canada to reduce GHG emissions 30% from 2005 levels by 2030.

But Canada has also tracked emissions since the baseline year of 1990, as required by United Nations guidelines.⁴

Since 1990, the transportation sector has successfully decreased the intensity of vehicle emissions, measured as grams of carbon dioxide equivalent (CO₂e) per kilometre. More specifically, as Canada's population grew at a compound annual rate of 1% between 1990 and

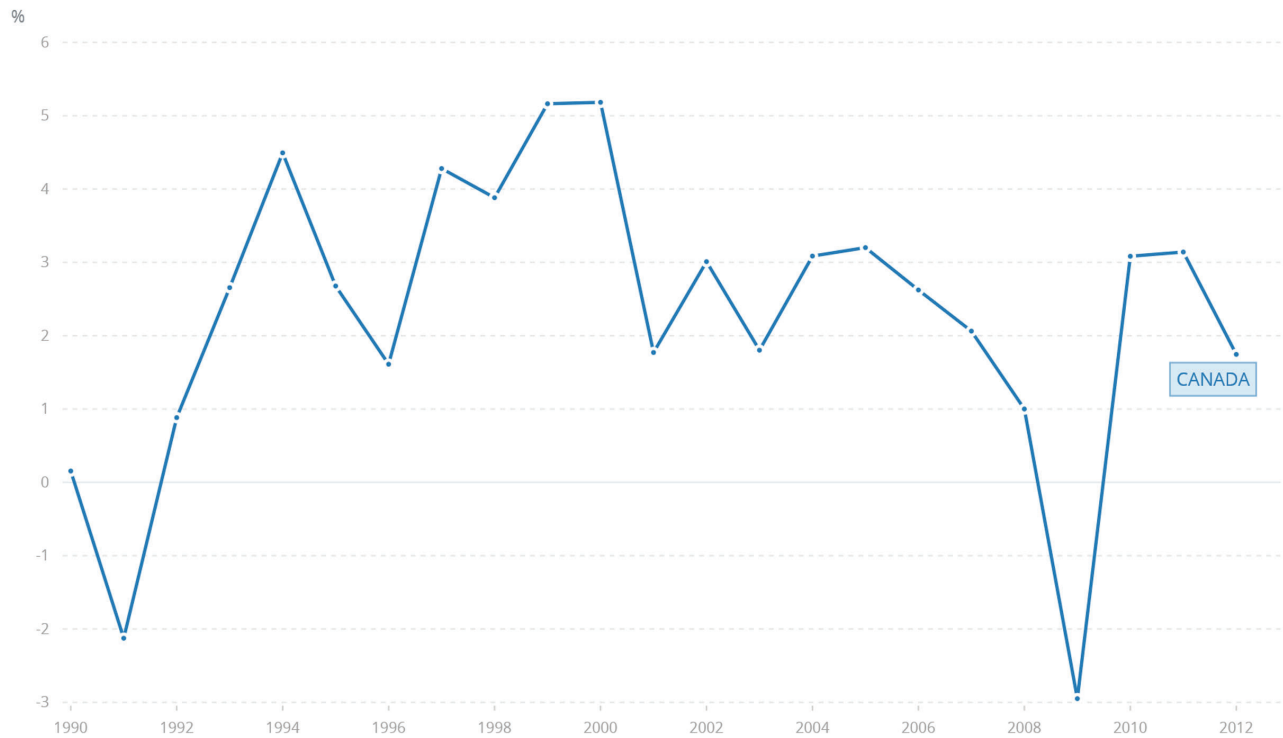
2012, the emissions intensities of passenger cars and trucks decreased at an annual rate of 1.2% and 0.7%, respectively. More recently, emissions by new light passenger vehicle models have achieved an average 11% decline between 2011 and 2015.⁵ Further reductions in average fuel consumption is projected as older vehicles are replaced.⁶

For freight transportation, Canada's GDP grew at a compound annual rate of 2.4% between 1990 and 2012 and over the same period. The emissions intensities of light-, medium- and heavy-duty freight trucks declined by an annual rate of 1.3%, 1.4% and 0.5%, respectively.⁷



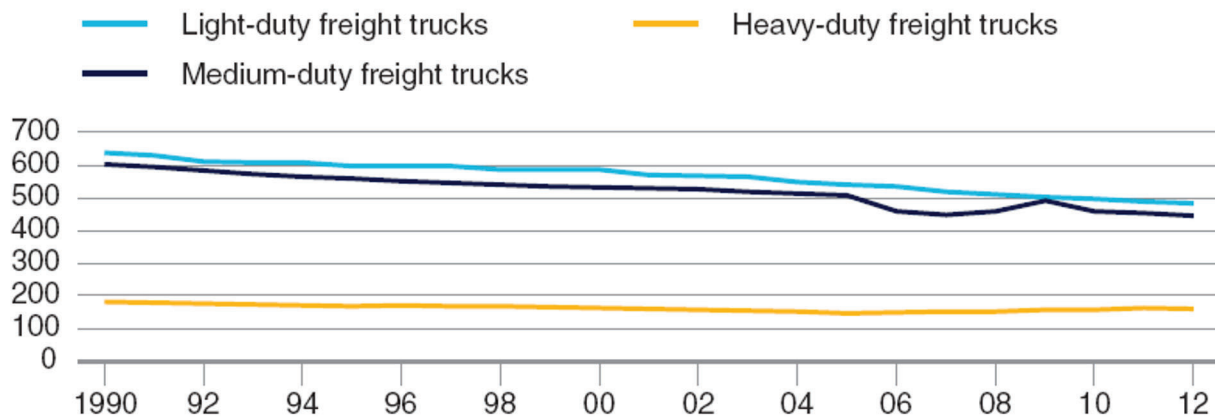
- 4 Government of Canada, "National Inventory Report 1990–2016: Greenhouse Gas Sources and Sinks in Canada: Executive Summary," 2018, www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions.html.
- 5 National Energy Board, "Canada's Energy Future," 2017, www.nebone.gc.ca/nrg/ntgrtd/ftr/2017/index-eng.html.
- 6 National Energy Board, "Market Snapshot: Vehicle Emissions Standards Will Reduce Gasoline Use," 2018, www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpsht/2018/07-03vhclmssns-eng.html.
- 7 Allison Robins, James Knowles and Len Coad, *A Long, Hard Road: Reducing GHG Emissions in Canada's Road Transportation Sector by 2050* (Ottawa: the Conference Board of Canada, 2015).

GDP growth (annual %)



Source: World Bank national accounts data, and OECD National Accounts data files.

Freight vehicles emissions intensity (g/tonne-km)



Source: Natural Resources Canada; The Conference Board of Canada.

The technological developments supporting these improvements have been driven partially by both voluntary and mandatory regulations on emissions by manufacturers and governments in Canada and the United States. One of many successful examples is the “SuperTruck” project launched in 2009. As part of that project, the United States Department of Energy shared half of a \$230-million budget with four manufacturers to reduce emissions by 50% for the largest trucking category (18 wheelers). All teams met or exceeded their reduction goals, leading to a renewal with higher targets.⁸ Similarly, since 2008, major light vehicle manufacturers have invested over \$64 billion for plant and technology upgrades just in the United States, with the goal of exceeding the Canadian–U.S. aligned vehicle standards⁹ and as a response to consumer demand.

However, despite the improvements to vehicle fuel consumption, overall GHG emissions from the transportation sector have increased. Some of the factors contributing to this include a substantial increase in population sprawl and distances travelled by Canadians, limited improvement to car-sharing trends, a growing consumer preference for larger vehicles the increasing longevity of older vehicles and the overall diversification of business supply chains and ecommerce models.¹⁰ Canada-U.S. industrial supply chains and “just-in-time” manufacturing trends have also increased road transportation demand.

While the transportation sector will continue to invest in technology that lowers its GHG emissions and costs, Canadian businesses of all sizes and in all parts of the country rely on an affordable transportation network to trade goods and services, participate in supply chains and move workers.

Enhancing regulatory alignment within the transportation industry

The high level of regulation in the transportation sector from all levels of government means that regulatory alignment within Canada and cross-border supply chains is crucial to industry competitiveness. Regulatory misalignment between provinces has prevented the voluntary adoption of more efficient standards on cargo dimensions (including maximum loads, long-configuration trailers, etc.) and speeds and truck technology, such as body panels, wide-base tires and trailer configurations.¹¹ These internal trade barriers increase compliance costs and force operators to maintain a less efficient status quo.

The industrial linkage between Canada and the United States has led to the successful alignment of several existing standards, including those on light- and heavy-duty vehicles. This alignment has also created a competitive expectation for continued alignment of future regulations to avoid an economically disruptive mismatch given the outsized impact of trade between the two countries.

8 John O'Dell, “SuperTruck Program Scores Big, Heads into Second 5-Year Phase,” Trucks.com, Oct. 31, 2016, www.trucks.com.

9 Bluegreen Alliance. “Driving Investment: How Fuel Efficiency Is Rebuilding American Manufacturing,” 2018, www.bluegreenalliance.org/wp-content/uploads/2018/01/Driving-Investment-report-v7.pdf.

10 Ibid.

11 Standing Senate Committee on Banking, Trade and Commerce, “Tear Down These Walls: Dismantling Canada's Internal Trade Barriers,” 2016, sencanada.ca/en/newsroom/government-must-tear-down-the-walls-created-by-internal-trade-barriers-to-free-canada-s-economy-senators-say



THE PAN-CANADIAN CLIMATE CHANGE FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

The PCF will include more than a dozen layered policies, including a national carbon price, a clean fuel standard (for building, industrial and transportation sectors), incentives to increase sales and adoption of electric vehicles, vehicle fuel-efficiency standards, methane capture, investment into transportation-demand management and a commitment to phase out subsidy programs for resource sectors by 2025.

According to modelling by Energy Innovation and the Pembina Institute,¹² the carbon price and “methane capture and destruction” will have the most significant impact on GHG emission reductions and are projected to be responsible for 73% of reductions by 2030.

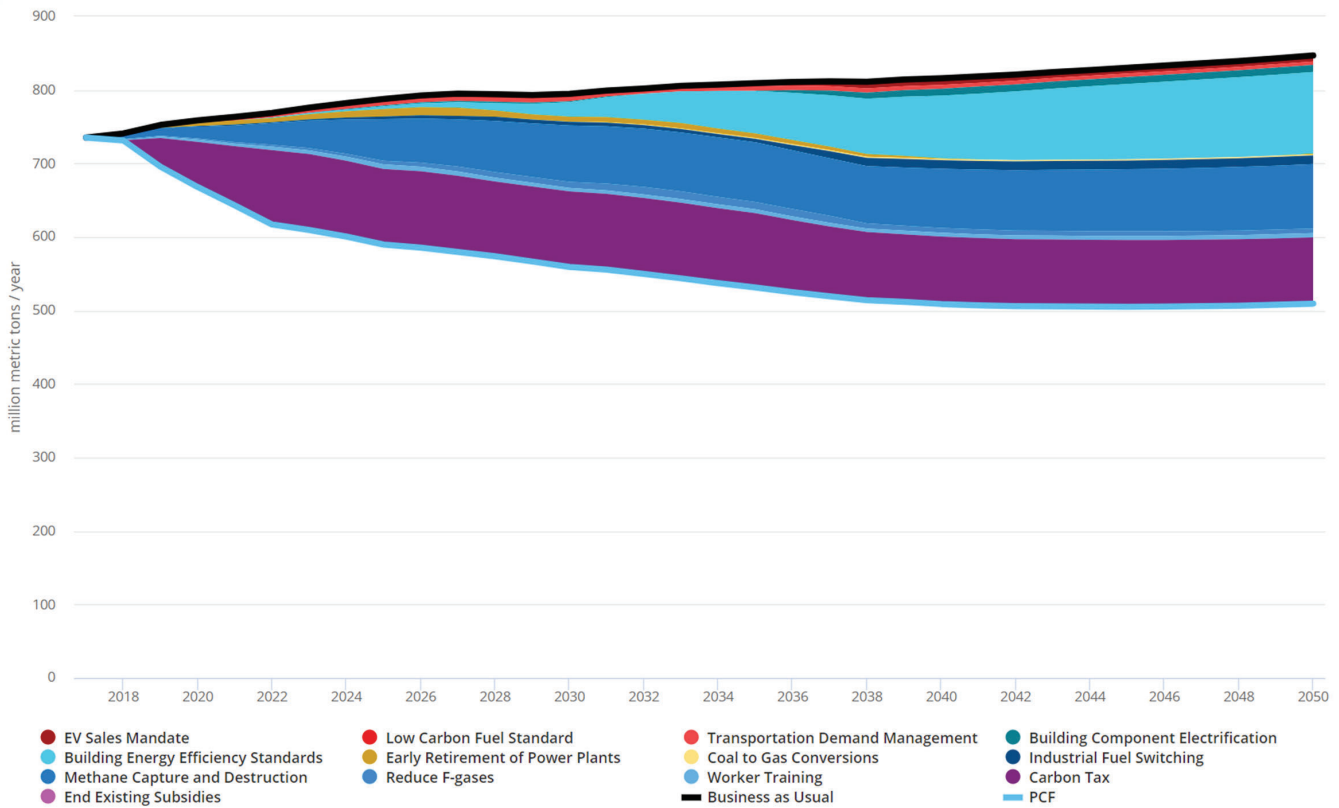
The cumulative impact of each of these policies will have a significant short- and mid-term impact on Canadian businesses and consumers.



12 Jeffrey Rissman, Robbie Orvis, Brianne Riehl, Benjamin Israël and Bora Plumtre, “Enhancing Canada’s Climate Commitments: Building on the Pan-Canadian Framework,” March 2018, energyinnovation.org/wp-content/uploads/2018/03/Canada-Energy-Policy-Simulator-Research-Note-FINAL.pdf.

Emissions abatement under the PCF broken out by policy

Effects by Policy: CO₂e Wedge Diagram



Source: Pan Canadian Framework was modelled using the Canada Energy Policy Simulator, originally created by Energy Innovation LLC and adapted for Canada in partnership with the Pembina Institute. <https://canada.energypolicy.solutions/>



Differences in PCF regulations between provinces are confusing for industries.



OTHER PCF POLICIES AFFECTING THE TRANSPORTATION SECTOR

Electric vehicle sales mandate and incentives

Under the PCF, Canada's federal government is a signatory to a target of 30% market share for electric vehicles among new on-road vehicles by 2030.¹³ These vehicles, classified as full or hybrid electric, are in the early stages of their technological cycle, which means they require public investments in charging infrastructure along routes and residences and carry a higher retail cost. Several provincial governments currently offer direct incentives to consumers, with Quebec offering up to \$8,000 off the purchase of an electric vehicle and British Columbia offering up to \$6,000. In the 2019 federal budget, the government announced a new incentive of up to \$5,000 for new personal electric vehicles (valued under \$45,000) and a tax write-off for vehicles purchased by businesses¹⁴.

However, in the current technological state of electric vehicles, some analysts have questioned the cost efficacy of these subsidies. For example, in 2017, the Government of Quebec's electric vehicle subsidies were equivalent to the cost of \$288 for the reduction of one tonne of GHG emissions¹⁵ versus a carbon price set between \$20 to \$50 per tonne by the PCF.

The effectiveness of reducing GHG emissions through electric vehicles is also dependent on the composition of the provincial electricity grid. In provinces like Saskatchewan and Alberta, where the electric grid is supplied through emissions-intensive sources, increased vehicle electrification can worsen overall GHG emissions reductions relative to the status quo.

Vehicle fuel-economy standards

As applicable to the sale of new vehicles (light-duty), the federal government will require that each vehicle manufacturer meet a fleet average fuel-economy standard for all new vehicles sold during a year. Vehicle fuel-economy standards can also be credit traded between manufacturers. Canadian fuel-economy standards are scheduled to target approximately 4.3 litres per 100 kilometres through 2025. The estimated development cost of new technologies to meet these standards—a cost that is expected to be passed onto consumers—is at least \$10 billion between 2017 and 2025.¹⁶

13 International Energy Agency, "New Clean Energy Ministerial Campaign Aims for Goal of 30% New Electric Vehicle Sales by 2030," June 8, 2017, www.iea.org/newsroom/news/2017/june/new-cem-campaign-aims-for-goal-of-30-new-electric-vehicle-sales-by-2030.html.

14 Government of Canada, "Investing in the Middle Class: Budget 2019", 82, <https://www.budget.gc.ca/2019/docs/plan/budget-2019-en.pdf>

15 Montreal Economic Institute, "Are Electric Vehicle Subsidies Efficient?," 2017, www.iedm.org/71215-are-electric-vehicle-subsidies-efficient.

16 Government of Canada, "Regulations Amending the Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations," Oct. 8, 2014, www.gazette.gc.ca/rp-pr/p2/2014/2014-10-08/html/sor-dors207-eng.html

Heavy-duty vehicle standards

Canadian fuel-economy standards for heavy-duty vehicles are created in alignment with U.S. standards and, similar to fuel-economy standards, aim to create an overall reduction in emissions by 2027. This new round of requirements applies to truck and bus models produced from

2021 to 2027 and commercial trailer models produced from 2020 through 2027. Additional compliance costs ranging from \$11,300 for new tractor-trailers to \$1,300 for pickup trucks and vans are projected.¹⁷ Similarly, operational costs associated with the deployment of efficiency technologies required to meet these standards is estimated to be \$6 billion.¹⁸



LOW-CARBON FUEL STANDARDS: EXISTING RENEWABLE FUEL REGULATIONS AND THE CLEAN FUEL STANDARD

For more than a decade, the percentage of liquid biofuels in gasoline and diesel have gradually increased, primarily through provincial and federal volumetric mandates.

Canada's federal renewable fuel standards require transportation fuel producers and importers to ensure gasoline and diesel contain an average renewable fuel content. This amount is mandated variably across provinces but can be averaged nationally to a 5% addition of ethanol (derived from processed sugar,

starch and forest products) for gasoline and 2% for diesel. Diesel mandates are roughly a combination of 40% traditional fatty acid methyl esters (FAME), derived from plant and animal fats, and 60% hydrogenation-derived renewable diesel (HDRD), derived from vegetable oils.

These regulations create several cost pressures for businesses in Canada. For starters, the addition of biofuels reduces the energy output for a vehicle compared to conventional gasoline, which means the net cost is determined through adjusting for this output. According to the latest figures from the United States Department of Energy, the U.S. national average for ethanol (E85) was 18 U.S. cents per




17 Government of Canada, "Regulations Amending the Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations and Other Regulations Made Under the Canadian Environmental Protection Act, 1999: SOR/2018-98," May 13, 2018, www.gazette.gc.ca/rp-pr/p2/2018/2018-05-30/html/sor-dors98-eng.html.

18 Ibid.

gallon (cpg) more expensive, while B99/100 biodiesel was 67 U.S. cpg more costly than conventional fuels,¹⁹ which roughly translates to 6.4 cents per litre (cpl) and 23.4 cpl in Canadian dollars. While the U.S.–Canadian biofuels market pricing is linked, there is very minimal public pricing data available for the Canadian biofuel markets. This report's consultations with industry experts have suggested that, in general, the

gasoline energy equivalent market price of biofuels is typically higher than their respective conventional equivalents (i.e., gasoline or diesel).

The following chart presents a conservative estimate of the cost premium of biofuels over conventional gasoline and diesel products after accounting for the lower energy output of renewable fuels.

Type of biofuel	Percentage premium over conventional carbon fuels	Premium in energy output adjusted cost per litre over conventional carbon fuels
 Ethanol	110% of regular unleaded gasoline (RUL)	+ 15 cpl vs. RUL
 FAME	125% of ultra-low sulphur diesel (ULSD)	+ 35 cpl vs. ULSD
 HDRD	150% of ULSD	+ 65 cpl vs. ULSD



19 US Department of Energy, "Clean Cities: Alternative Fuel Price Report," July 2018, afdc.energy.gov/files/u/publication/alternative_fuel_price_report_july_2018.pdf.

In addition to the required standards, the provincial and federal governments have also introduced a slate of tax credits, grants and production incentives to drive adoption of biofuels. This has led to demand outstripping supply, with at least 40% of biofuels imported from the United States and Singapore over the last several years.²⁰

Due to the chemical differences between biofuels and conventional carbon fuels, the supply chain across Canada—which includes ports, refineries and small businesses operating gas stations—also has to plan for infrastructure investments to enable the blending and transportation of biofuels.

These biofuel content requirements are expected to increase with the implementation of the Clean Fuel Standard (CFS). First proposed conceptually in November 2016 as a component of the PCF, the CFS aims to reduce Canada's GHG emissions by 30 megatonnes of CO₂e by 2030. It is expected to supplement renewable fuel regulations while layering new requirements for carbon-intensity reductions throughout the lifecycle of solid, liquid and gaseous fuels produced and consumed in Canada. Businesses are awaiting the first in a series of draft regulations and cost-benefit analyses, which is to be released by spring 2019.

It is a widely recognized regulatory design principle that mandatory content requirements and compliance pathways are not a cost-efficient tool for achieving emissions reductions. Compared to the flexibility of a carbon price, the CFS will create unintended regulatory costs for businesses throughout the fuel and transportation industries while stifling investment and innovation activities within the natural resource and manufacturing sectors. For example, while the government's latest CFS regulatory design paper proposes a market for fuel suppliers to generate and trade credits for compliance, it severely restricts the ability of businesses to trade them across fuel types, driving up compliance costs.

Other studies similarly question the economic efficiency of preferential government subsidies. For example, the Ecofiscal Commission²¹ calculated the cost of government support for renewable fuels between 2010–2015 specifically around reducing emissions through ethanol policies at approximately \$180 to \$185 per tonne of CO₂e reductions and \$128 to \$165 per tonne of CO₂e with biodiesel.

20 Ibid.

21 Ecofiscal Commission, "Course Correction: It's Time to Rethink Canadian Biofuels Policies," Oct. 2016, ecofiscal.ca/wp-content/uploads/2016/10/Ecofiscal-Commission-Course-Correction-Biofuels-Report-October-2016.pdf.



FINANCIAL IMPACT OF THE CLEAN FUELS STANDARD AND PAN-CANADIAN CLIMATE CHANGE FRAMEWORK ON PROVINCES WITH FEDERAL BACKSTOP

On October 23, 2018, the federal government announced details of its carbon pricing backstop system, which is currently expected to be applied to Ontario, New Brunswick, Manitoba and Saskatchewan: the provinces without a carbon pricing plan adherent to federal standards. All other provinces have established or announced a mix of strategies to meet the federal targets.

The backstop will consist of two components: a carbon fuel levy applied to fuels and an output-based pricing system (OBPS) for industrial facilities that have reported emissions of 50,000 tonnes of CO₂e per year, including an option for facilities above 10,000 tonnes of CO₂e to voluntarily opt into the OBPS.

The carbon fuel levy will apply to prescribed liquid, gaseous and solid carbon-fuel emissions at variable rates that are equivalent to \$20 per tonne of CO₂e in 2019, increasing annually up to \$50 per tonne of CO₂e by 2022.²² The OBPS will be negotiated and applicable to fuel industry facilities as a percentage reduction to current GHG emission levels.

To demonstrate the economic impact of PCF regulations on the transportation sector, this report completed a simple pricing model (as detailed in the appendix). The model uses the latest gasoline and diesel fuel sale estimates to project the retail price impact of just two PCF regulations: the fuel levy within the federal carbon price backstop²³ and the CFS. This model conservatively excludes several demand and supply factors for fuel pricing, including the global supply of biofuels, industrial costs to be incurred by fuel refineries and retailers, trade exposure and the cumulative impact of other government regulations.

22 Government of Canada, "Backgrounder: Fuel Charge Rates in Listed Provinces and Territories," Oct. 2018, www.canada.ca/en/department-finance/news/2018/10/backgrounder-fuel-charge-rates-in-listed-provinces-and-territories.html.

23 An economic impact analysis of the OBPS has not yet been published by government. Therefore, this report excludes it from the retail cost estimate.

Despite these exclusions, the combined impact of the fuel levy and renewable fuel standards in the years 2019 and 2025 would be:

- A minimum economic impact of \$2.3 billion translating to an additional 5.17 cpl on retail gasoline prices in 2019 and \$1.95 billion and 6.43 cpl on diesel fuel prices in 2019.
- By 2025, these costs can be projected to escalate to \$1.9 billion and 12.55 cpl for gasoline, while diesel costs will be an additional \$5.2 billion and 17.2 cpl.

While the fuel industry has complex pricing mechanisms,²⁴ the majority of regulatory costs are passed through the supply chain to retail

consumers. These findings are further supported through the experience of two of the most prominent jurisdictions with fuel standards:

- Low-carbon fuel standards (LCFS) in **British Columbia** have contributed to a measurable increase in retail pricing, according to an analysis published by the Kent Group in September 2018, whereby the introduction of LCFS strongly coincided with higher retail prices relative to other Canadian provinces.²⁵
- According to a recent report by the Fuels Institute on LCFS in **California**, "the increase in fuel costs to consumers in 2020 may rise to 21 cpg (~7.4 CDN cpl) then nearly triple to 69 cpg (~24.5 CDN cpl) by 2030 under the proposed regulation."²⁶



IMPLICATIONS FOR CANADIAN BUSINESSES

Canadians rely on an affordable transportation network for the movement of goods, employees and customers through Canada's vast geography.

Canadian businesses also operate an increasingly diversified economy, ambitiously pursuing new export markets, responding to growing demand

for ecommerce and participating in supply chains within North America and beyond.

The federal government faces a challenging public policy environment in developing the PCF to reduce Canada's GHG emissions while simultaneously balancing its responsibilities to govern a competitive economy. The PCF's layered cost approach will affect all businesses in Canada.

24 Kent Group, "Report: Understanding Retail Transportation Fuel Pricing in Ontario", 2017, www.oeb.ca/sites/default/files/uploads/Report-Retail-Transportation-Fuel-Pricing-20171023.pdf.

25 Kent Group, "Quarterly Report of Petroleum Pricing in Canada," Sept. 2018, www.kentgroup.com/wp-content/uploads/2018/10/September_2018_Eng.pdf.

26 Fuels Institute, "Market Reactions to Low Carbon Fuel Standard Programs," Feb. 2019, www.fuelsinstitute.org/getattachment/80f830c3-433b-45d3-aaa9-090c79baa7ad/Market-Reactions.pdf, 46.

The transportation sector operates in a highly competitive market and is significantly trade exposed. The PCF regulations will also be layered on top of existing programs like the substantial fuel tax, which represented approximately \$22 billion in federal, provincial and municipal revenues in 2016. In Ontario, government revenue generated from fuel taxes was \$7.4 billion in 2016, \$5.9 billion of which comes from gasoline—translating to an average of \$745 per registered light-duty vehicle in Ontario and \$1,133 per household in the province.²⁷

While it is easy to quantify the impact of the PCF on households and possibly address it through tax rebates, businesses will face compliance as expenses (e.g., fuel prices, higher input costs, trade exposure) and capital expenditures. For example, a \$50/tonne CO₂e carbon tax is estimated to add \$10,000 in expenses per truck, totalling more than \$1 million in costs for a typical mid-sized operator with a 100-vehicle fleet. Similarly, while natural gas conversion is a potential alternative, conversion costs are estimated at between \$15,000 to \$65,000 per vehicle, with several hundred million more needed for development costs and refuelling infrastructure.²⁸

Canadian businesses recognize that climate change is a defining issue of our time and are prepared to participate in government efforts to reduce GHG emissions. However, they also expect the government to pursue the PCF at the lowest possible cost to business competitiveness, driven through market principles versus onerous

regulations. Businesses also expect these measures to be revenue neutral, with any revenues channelled back to business. It is also important for the government to minimize the competitive exposure and relative disadvantage of Canadian businesses and jobs against countries with significantly lower or even no regulations against emissions.

It is concerning to businesses that the latest CFS discussion paper (from the Ministry of Environment and Climate Change Canada) states: “Currently, there are no models within the Department designed to model emission reductions, credit supply or economic impacts of a CFS policy in detail. The Department is currently developing a Fuel Lifecycle Assessment Modelling Tool and is updating existing economic models to assess the CFS. The [cost-benefit analysis] may use new and updated models for publication in the Canada Gazette, Part II, should they become available in time, and as appropriate.”²⁹

In the absence of a comprehensive government cost-benefit analysis, this report uses industry compliance estimates and case studies from other jurisdictions to demonstrate the potential impact on businesses. It is clear the cumulative regulatory impact of PCF will create competitive pressure between provinces, trade exposed industrial sectors and affordable transportation in Canada. It is critical for the government to recognize these structural challenges in its design and evaluation of regulatory policies governing the CFS and PCF.

27 Kent Group, “Report: Understanding Retail Transportation Fuel Pricing in Ontario”, 2017, www.oeb.ca/sites/default/files/uploads/Report-Retail-Transportation-Fuel-Pricing-20171023.pdf.

28 International Institute for Sustainable Development, “Clean Fuel Standard: Summary of Stakeholder Written Comments on the Discussion Paper,” 2017, www.iisd.org/sites/default/files/publications/clean-fuel-standard-summary-comments-en.pdf, 21-22.

29 Government of Canada, Clean Fuel Standard Cost-Benefit Analysis Framework, Feb. 2019, www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard/cost-benefit-analysis-framework-february-2019.html



LOOKING FORWARD

In mid-2018, the federal government announced it was delaying the implementation of the CFS, the final regulations of which were originally set for publication in 2019.

It now expects to publish draft regulations and cost-benefit analyses for liquid fuels (i.e., gasoline, diesel fuel, jet fuel, kerosene and light- and heavy-fuel oils) in spring 2019, with final regulations published in 2020 and coming into force by 2022. For gaseous fuels (i.e., natural gas and propane) and solid fuels (i.e., coal and coke), the government expects to publish proposed regulations in fall 2020, finalize them in 2021 after consultations and bring them into

force by 2023. While this report has focused on the road transportation sector, there are also concerns from the rail, marine and aviation sectors regarding the feasibility of implementing the CFS given these sectors' compliance requirements with international operational and safety standards and the current state of fuel technologies.

The PCF approach of adding new regulations and subsidies on top of carbon pricing eliminates the efficiency benefits of a market-based approach to reducing emissions. The government should use this delay as an opportunity to articulate how it will reduce the overall regulatory burden on Canadian companies and protect the competitiveness of Canada's economy.





RECOMMENDATIONS

As currently designed, the federal government's PCF will affect Canada's economic competitiveness by adding to the significant tax and regulatory burdens already facing Canadian firms.

The long-term success of Canada's ability to reduce GHG emissions at the lowest cost will be driven by the development and adoption of industry innovation as a response to market-based incentives and consumer signals. It is critical for the government to recognize the importance of Canada's transportation sector, which serves all businesses and consumers in Canada.

To limit the negative competitiveness impacts of the PCF, the federal government should:

1. Reduce other regulatory costs on businesses to coincide with the increase in carbon price costs.

By layering new regulatory costs through measures such as the CFS, the PCF will not realize the efficiency benefits of a carbon price. If the federal government moves forward with a national carbon price and the CFS, it must find ways to significantly lower other regulatory costs on Canadian transportation. This should include harmonizing or eliminating programs like the provincial and federal renewable fuel standards.

2. Conduct a comprehensive cost-benefit analysis of the Clean Fuel Standard.

The CFS will implement a complex series of regulations, emissions targets and a new market to trade emissions credits that will create substantial competitive pressures on the entire fuel supply chain, including retail costs for transportation. To build industry, investor and public trust in the system, the government should publish a comprehensive cost-benefit analysis—looking at factors like infrastructure upgrade requirements across the fuel supply chain—before concluding regulatory design and implementation. The analysis should compare compliance costs versus a carbon price and account for the competitive risk to energy-intensive, trade-exposed industries if the final regulations cover fuels in industrial processes, especially those in refineries.

3. Minimize the competitiveness impacts of the Clean Fuel Standard.

The government should work with industry to ensure the design of the CFS regulations is highly flexible and neutral on technology and fuel types. The government should also ensure credits can be widely traded across sectors (transportation, industrial, building), programs and up- and downstream of the fuel industry to maximize market activity, encourage innovation and minimize regulatory costs.

For example, the OBPS within the carbon price framework will also regulate many businesses subject to the CFS. As these investments reduce the emissions intensity of their operations, companies should be able to count these investments toward compliance credits for the CFS. Similarly, investments into refineries and other facilities to align with the CFS should garner OBPS credits.

The targets within the CFS should also be reviewed on a scheduled basis and evaluated for efficacy in reducing GHG emissions versus alternatives like carbon pricing. The analysis should also cover the ongoing competitive risk to energy-intensive, trade-exposed industries if the final regulations cover fuels in industrial processes, especially those in refineries.

4. Increase transportation infrastructure investments.

The federal government should devote a larger share of its infrastructure budget to investing in trade-enabling transportation infrastructure. In addition to the long-term economic benefits, infrastructure investments in Canada's trade corridors can reduce GHG emissions by decreasing congestion along key transportation routes. Improving the velocity of Canada's supply chains can help offset the negative competitiveness impacts of new tax and regulatory costs.

5. Lower the regulatory barriers to the adoption of efficient transportation technologies.

Governments across Canada should immediately prioritize the elimination of divergent trucking regulations that are preventing the adoption of efficient technologies and processes. The federal government should also maintain regulatory alignment on transportation standards with the United States.



Canada imports 40% of ethanol and 70% of its biodiesel consumption.



APPENDIX

Calculating the Estimated Impact of Carbon Pricing, Clean Fuels and Renewable Fuel Standards for 2019 and 2025

Regulation 1: Federal backstop carbon fuel levy, as currently applied to Ontario, New Brunswick, Manitoba and Saskatchewan

Existing provincial carbon levy (e.g., \$30 per tonne) and forecasted levy (\$50 per tonne by 2022), translated to cents per litre (cpl).



Carbon levy (\$/tonne)	Estimated cents per litre (cpl)		
	Gasoline (Basis: 2.21 tonnes CO ₂ e/kL)	Jet fuel (Basis: 2.58 tonnes CO ₂ e/kL)	Diesel (Basis: 2.68 tonnes CO ₂ e/kL)
20 (04/2019)	4.42	5.16	5.37
30 (2020)	6.63	7.75	8.05
40 (2021)	8.84	10.33	10.73
50 (2022)	11.05	12.91	13.41

Regulation 2: Existing Renewable Fuels Regulations (2019) and the Clean Fuel Standard (2020–2030)

For more than a decade, liquid biofuel presence in gasoline and diesel have gradually increased primarily through provincial and federal volumetric mandates. The current level of biofuels in the Canadian gasoline and diesel pools is estimated as follows:



Fuel pool	Current estimated biofuel content (%)
Gasoline	6.4% ethanol national ³⁰ Obligations vary by provincial jurisdictions (0–8.5%)
Diesel	2.0% renewable diesel national 40% biodiesel (FAME) 60% hydrogen-derived renewable diesel (HDRD) Obligations vary by provincial jurisdictions (0–4%)

30 United States Department of Agriculture, "Canada Biofuels Annual," 2017, gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_Ottawa_Canada_4-6-2018.pdf, 8.

While there is very limited public pricing data available for the Canadian biofuel markets, engagements with industry experts suggest that, in general, the gasoline energy equivalent market price of biofuels is typically higher than their respective conventional hydrocarbon blendstock (i.e., gasoline or diesel). For example, according to the United States Department of Energy, the U.S. national average for ethanol (E85) was 18 U.S. cents per gallon (cpg) (~ 6.4 Canadian cpl) more expensive, while B99/100 biodiesel was 67 U.S. cpg (~ 23.8 Canadian cpl) more expensive than conventional fuels.³¹ The model below presents the estimated price premium.

Type of fuel	Price premium over standard fuels	Cost per litre over standard fuels
Ethanol	110% of regular unleaded gasoline (RUL)	+ 15 cpl vs. RUL
FAME	125% of ultra-low sulphur diesel (ULSD)	+ 35 cpl vs. ULSD
HDRD	150% of ULSD	+ 65 cpl vs. ULSD

The gasoline and diesel pool biofuel content is expected to increase gradually upon implementation of the proposed federal Clean Fuel Standard (CFS). The biofuel volumetric content varies depending on the forecasting model used. Such volume will be highly dependent on biofuels availabilities and carbon intensities (CI).

Fuel	2025	2030
Gasoline	8–12% ethanol	11–18% ethanol
Diesel	6–8% renewable diesel	10–13% renewable diesel

Note: This conservative model assumes no recovery of additional infrastructure requirements on fuel producers, refineries and retailers to blend higher concentrations biofuels within their facilities per future requirements of the CFS.

Net retail impact

The pricing exercise on the following page calculates the estimated overall economic impact through retail prices for consumers in Canada with a hypothetical national application of the fuel levy within the federal carbon pricing backstop and existing renewable fuel standards.



³¹ US Department of Energy, "Clean Cities: Alternative Fuel Price Report," July, 2018, 25-26, afdc.energy.gov/files/u/publication/alternative_fuel_price_report_july_2018.pdf.

Scope and basic fuel information

Transportation fuels: gasoline, diesel and jet fuel

Net sales of gasoline in Canada: 45,000,000 kilolitres (kL)

Net sales of on-road diesel in Canada: 17,600,000 kL

Net sales of diesel in Canada: 30,400,000 kL (all diesel products)

Net sales of aviation turbo fuel for major airlines in Canada: 7,588,000 kL (2017)³²



Gasoline pool climate change regulatory burden

	2019		2025	
	\$M/year	cpl	\$M/year	cpl
Renewable fuels and Clean Fuel Standard	338	0.75	676	1.50
Carbon cost	1,989	4.42	5,027	11.05
	2,327	5.17	5,703	12.55

Example:

For 2019

Renewable fuels and CFS: 45,000,000 kL/year * 5% * \$0.15/L delta for ethanol (EtOH) = \$338M or 0.75 cpl

Carbon cost: 45,000,000 kL/year * 2.21 TCO₂e/kL * \$20/tonne = \$1,989M or 4.42 cpl

Total monetary burden in 2019: \$2,327M or 5.17 cpl

For 2025

Renewable fuels and CFS: 45,000,000 kL/year * 10% * \$0.15/L delta for EtOH = \$676M or 1.50 cpl

Carbon cost: 45,000,000 kL/year * 2.21 TCO₂e/kL * \$50/tonne = \$5,027M or 11.05 cpl

Total monetary burden in 2025: \$ 5,703 M or 12.55 cpl

Diesel pool climate change regulatory burden

	2019		2025	
	\$M/year	cpl	\$M/year	cpl
Renewable fuels and Clean Fuel Standard	322	1.06	1,128	3.71
Carbon cost	1,629	5.37	4,073	13.41
	1,951	6.43	5,320	17.12

Example:

For 2019

Renewable fuels and CFS:

30,400,000 kL/year * 2% * 40% * \$0.35/L delta for FAME = \$85M or 0.28 cpl

30,400,000 kL/year * 2% * 60% * \$0.65/L delta for HDRD = \$237M or 0.78 cpl

Carbon cost: 30,400,000 kL/year * 2.68 TCO₂e/kL * \$20/T = \$1,629M or 5.37 cpl

Total monetary burden in 2019: \$1,951 M or 6.43 cpl

For 2025

Renewable fuels and CFS:

30,400,000 kL/year * 7% * 40% * \$0.35/L delta for FAME = \$298M or 0.98 cpl

30,400,000 kL/year * 7% * 60% * \$0.65/L delta for HDRD = \$830M or 2.73 cpl

Carbon cost: 30,400,000 kL/year * 2.68 TCO₂e/kL * \$50/tonne = \$4,073M or 13.41 cpl

Total monetary burden in 2025: \$5,201M or 17.12 cpl

³² Statistics Canada, Table 23-10-0079-01, "Operating and Financial Statistics for Major Canadian Airlines, monthly, (01/2017 – 12/2017)."

Turbo jet fuel climate change regulatory burden for major Canadian airlines

For 2019

Carbon cost: $7,588,000 \times 2.58 \text{ TCO}_2\text{e/kL} \times \$20/\text{tonne} =$
\$0.3915M or 5.16 cpl

For 2025

Carbon cost: $7,588,000 \times 2.58 \text{ TCO}_2\text{e/kL} \times \$50/\text{tonne} =$
\$0.9789M or 12.91 cpl



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