

IEA-Advanced Motor Fuels ANNUAL REPORT 2022

Canada



Canada

Drivers and Policies

Clean Fuel Regulations

Registered on June 21, 2022, the [Clean Fuel Regulations](#) (CFR) require producers and importers of gasoline or diesel to reduce the carbon intensity of the gasoline and diesel they produce in and import into Canada for use in Canada. The Regulations establish a credit market whereby the annual carbon intensity reduction requirement could be met through three main categories of credit-creating actions:

1. Actions throughout the lifecycle of a liquid fossil fuel that reduce its carbon intensity, by carrying out a Carbon Dioxide Equivalent emissions-reduction project.
2. Supplying low-carbon-intensity fuels.
3. Supplying fuel or energy to advanced vehicle technology.

The annual carbon intensity reduction requirements for gasoline and diesel will come into force on July 1, 2023, starting at 3.5 grams of carbon dioxide equivalent per unit of energy and increasing to 14 grams in 2030. Once fully implemented, the CFR will help cut up to 26.6 million tonnes of greenhouse gas pollution in 2030. In combination with the Government of Canada's \$1.5 billion [Clean Fuels Fund](#), the CFR will create incentives for the increased domestic production of low carbon intensity fuels. Alongside the federal policy, Canada has provincial renewable fuel and low carbon fuel requirement regulations which prescribe specific renewable fuels volumes and carbon intensity.

Renewable-fuels-related Standards

[The Canadian General Standards Board](#) (CGSB) is responsible for developing fuel and renewable fuel quality standards, via consensus by public and private sectors (see Table 1).

Table 1. CGSB Renewable Fuel-quality-related Standards

Fuel Standard	Number
Oxygenated automotive gasoline containing ethanol (E1–E10)	CAN/CGSB 3.511
Automotive ethanol fuel (E50–E85 and E20–E25)	CAN/CGSB 3.512
Denatured fuel ethanol for use in automotive spark ignition fuels	CAN/CGSB 3.516
Diesel fuel containing low levels of biodiesel (B1–B5)	CAN/CGSB 3.520
Diesel fuel containing biodiesel (B6–B20)	CAN/CGSB 3.522
Biodiesel (B100) for blending in middle distillate fuels	CAN/CGSB 3.524

Greenhouse Gas Emission Regulations

In 2021 Canada completed a mid-term evaluation of the appropriateness of its standards for model years 2022 to 2025 under the [Passenger Car and Light Truck GHG Emission Regulations](#), concluding that the U.S. standards established in 2020 that increased by roughly 1.5% per year were not stringent enough to meet Canada's climate goals. Canada is working with both the United States and the State of California to develop future LDV GHG regulations while intending to align with the most stringent LDV GHG tailpipe regulations in the United States, whether at the federal or state level. In March 2022, Canada published the [2030 Emissions Reduction Plan](#) with a commitment to develop regulations to achieve 100% of new light-duty vehicles being zero-emissions vehicles (ZEVs) by 2035, with interim targets of at least 20% in 2026 and at least 60% in 2030. In December 2022, ECCC published proposed regulations to amend the [Passenger Car and Light Truck GHG Emission Regulations](#) to achieve those ZEV targets.

In 2018, Canada published the [Regulations Amending the Heavy-Duty Vehicle \(HDV\) and Engine Greenhouse Gas Emission Regulations](#). The amendments established more stringent GHG emission standards for heavy-duty vehicles and their engines, starting with the 2021 model year. Consideration to the amendments introducing new GHG emission standards that apply to trailers hauled by on-road transport tractors are being assessed. Amendments are estimated to result in cumulative fuel savings of 27.7 billion liters with respect to the portion of the lifetime operation of model years 2020 to 2029 that occurs between 2020 and 2050.

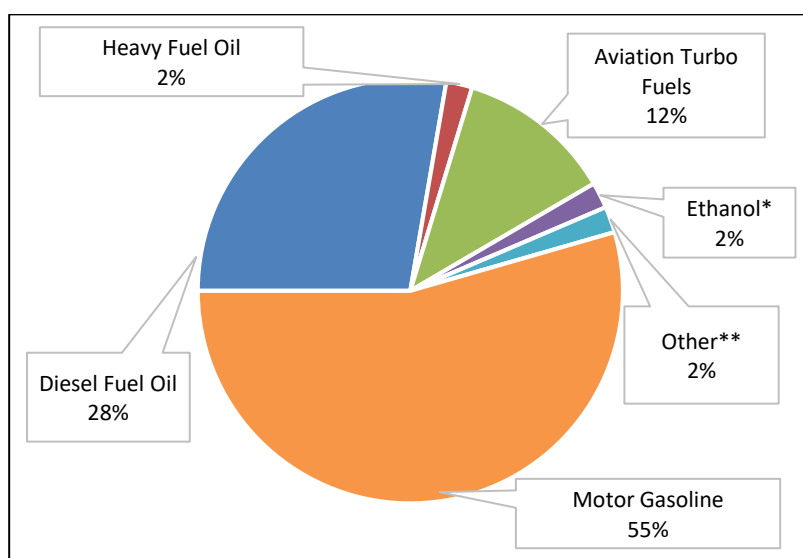
The [2030 Emissions Reduction Plan](#) also includes a commitment to further improve the efficiency of heavy-duty vehicle standards for post-2025 by aligning with the most stringent standards in North America whether at the U.S. federal or state level. Furthermore, the Government of Canada also committed to develop a MHDV (Medium Heavy Duty Vehicle) ZEV regulation to require 100% MHDV sales to be ZEVs by 2040 for a subset of vehicle types based on feasibility, with interim 2030 regulated sales requirements that would vary by vehicle category based on feasibility, and explore interim targets for the mid-2020s.

Pan-Canadian Framework on Clean Growth and Climate Change (PCF)

The [Pan-Canadian Framework](#) is the federal, provincial, and territorial plan to grow the economy, reduce GHG emissions, and build resilience in the face of a changing climate. The PCF includes more than 50 concrete actions that cover all sectors of the Canadian economy and puts Canada on a path toward meeting its Paris Agreement GHG-emissions-reduction target of 31% below 2005 levels by 2030.

Advanced Motor Fuels Statistics

Figure 1 shows [energy use by fuel type](#) in 2019 for transportation in Canada. Table 2 shows supply and demand for ethanol and biodiesel.



*Ethanol proportion is estimated on the basis of production data.

**Includes electricity, natural gas, aviation gasoline, and propane.

Fig. 1. Fuel Mix of the Canadian Transportation Sector, 2019

Table 2. Canadian Supply and Demand of Biofuels, 2021 (in millions of liters)

Parameter	Ethanol	Biodiesel
Canadian production	1,642	416
Imports	1,254	573
Exports	108	440
Domestic use	2,946	796

Research and Demonstration Focus

ecoTECHNOLOGY for Vehicles (eTV) Program

Transport Canada's Innovation Centre's [eTV Program](#) is an initiative that conducts in-depth safety and environmental performance testing on a range of new and emerging advanced passenger car and truck

technologies. The program investigates the performance of alternative-fueled vehicles, including renewable fuels, hybrid and electric, CNG, and hydrogen fuel cell vehicles.

Program of Energy Research and Development (PERD)

The Natural Resources Canada (NRCan) program [PERD](#) supports energy R&D conducted by the federal government and is designed to ensure a sustainable energy future for Canada. Key research areas focus on knowledge and technology that will help reduce the carbon footprint of fuels and emissions from transportation sources.

Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative (EVAFIDI)

Through NRCan's [EVAFIDI](#) program, \$260 million was invested into public infrastructure to encourage the switch to low- or zero-emission vehicles. As of 2022, a total of 638 electric, hydrogen, and natural gas stations have been opened.

Zero Emissions Vehicle Infrastructure Program (ZEVIP)

[ZEVIP](#) is a \$680 million initiative to address the lack of charging and refueling stations in Canada by increasing the availability of localized charging and hydrogen refueling opportunities. The program provides opportunities for owners/operators of ZEV infrastructure, delivery organizations, and Indigenous organizations.

Strategic Innovation Fund (SIF)

The [SIF](#), managed by Innovation, Science and Economic Development Canada, provides support to Canadian businesses investing in innovation and to industry efforts to accelerate the production of low- and zero-emission vehicles and the battery supply chain.

Incentives for Zero Emissions Vehicles Program (iZEV)

To encourage Canadians' adoption of ZEVs, the Government of Canada, led by Transport Canada, launched [this program](#) to provide incentives for consumers to buy ZEVs. In terms of total ZEVs on the road, steady annual progress towards the target of 100% ZEV sales by 2035 would translate to approximately 1.4 million ZEVs on the road by 2026 (about 5% of total light-duty vehicles on the road); 4.6 million on the road by 2030 (about 16%); and 12.4 million on the road by 2035 (about 40%).

Clean Transportation System-Research and Development Program (CTS-RD)

Transport Canada established the [CTS-RD](#) to support projects that help improve the environmental performance of Canada's transportation system, specifically in the rail, marine, and aviation sectors. The program looks to advance new clean technology innovations, practices, or research.

Canada's Aviation Climate Action Plan

[Canada's Action Plan to Reduce GHG Emissions from Aviation](#) includes research and development to support Canada's commitments to achieve net-zero emissions by 2050. In 2022, more than 60 airlines operating in Canada created the Canadian Council for Sustainable Aviation Fuels, which brings together industry and government to develop a competitive roadmap for Canadian-made sustainable aviation fuels (SAF).

Figure 2 shows how each key measure may contribute to the reduction of aircraft emissions by 2050.

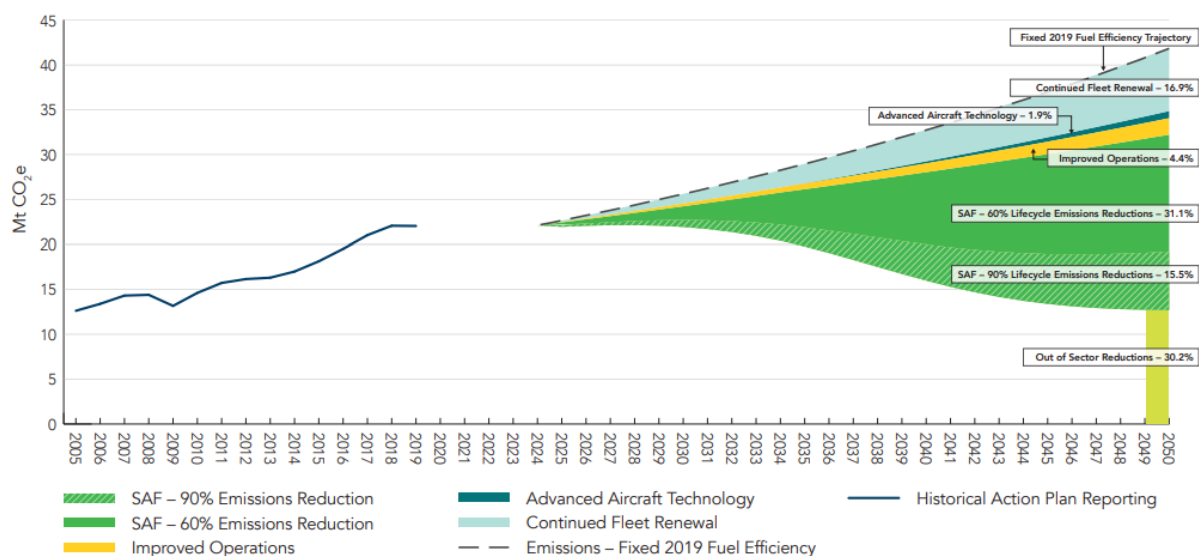


Fig. 2. 2050 Canadian Aircraft Emissions Forecast: A Vision to Net-Zero

Hydrogen Strategy for Canada

NRCan has been engaging with stakeholders, government and Indigenous partners to create [the Hydrogen Strategy for Canada](#), which seeks to leverage Canada's hydrogen through various pathways including fuel for transportation. The strategy includes hydrogen end-use opportunities for light-duty vehicles, buses, trucks and equipment, rail, marine, and aviation.

Outlook

As depicted in [Table 3](#), the Canadian transportation sector comprises several distinct subsectors, and each exhibits different trends during the projected period. GHG emissions from cars, trucks, and motorcycles are projected to decrease by 20 Mt between 2005 and 2030, while those for heavy-duty trucks and rail are projected to increase by 14 Mt.

Table 3. Transportation: GHG Emissions (Mt CO₂-eq)

Transportation Subsector	2005	2020	2030	Δ 2005 to 2030
Passenger Transport	90	88	70	-20
Cars, light trucks, and motorcycles	82	79	61*	-21
Bus, rail, and domestic aviation	8	9	9	1
Freight Transport	62	73	73	11
Heavy-duty trucks, rail	54	68	68	14
Domestic aviation and marine	8	5	5	-3
Other: recreational, commercial, and residential	10	9	10	0
Total	162	170	153	-9

*Projections based on current emissions standards for model years 2017 to 2025.