

# IEA-Advanced Motor Fuels ANNUAL REPORT 2023

## 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 fuels they produce in, and import into, Canada for use in Canada. The regulations establish a credit market in which the annual requirement to reduce carbon intensity can be met through three main categories of credit-creating actions:

1. Undertaking projects that reduce the lifecycle carbon intensity of liquid fossil fuels
2. Supplying low-carbon-intensity fuels, and
3. Supplying fuel or energy to advanced vehicle technology.

The annual carbon intensity reduction requirements for gasoline and diesel came into force on July 1, 2023, starting at 3.5 grams of CO<sub>2</sub>e 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 (Mt) of greenhouse gas (GHG) pollution in 2030. In combination with the Government of Canada's \$1.5 billion [Clean Fuels Fund](#), the CFR creates incentives for the increased domestic production of low-carbon-intensity fuels. Along with the federal policy, Canada has provincial renewable fuel and low-carbon fuel requirement regulations that 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 through consensus with the 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 and E11-E15)	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](#). Further, Canada is working with both the United States and the State of California to develop future light-duty vehicle (LDV) GHG regulations that 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 LDVs as zero-emissions vehicles (ZEVs) by 2035, with interim targets of at least 20% in 2026 and at least 60% in 2030.

Canada published the [Regulations Amending the Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations](#) on December 20, 2023. These amendments require auto manufacturers and importers to meet increasingly stringent annual ZEVs targets, including the targets specified in the Emissions Reduction Plan (20% for the 2026 model year, 60% by 2030, and 100% for 2035). The next phase of Canadian emission standards will be informed by the release of the U.S. Environmental Protection Agency's (U.S. EPA's) final rulemaking entitled "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles."

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

In 2023, Canada developed a regulatory framework for the transition of the MHDV sector to ZEVs to reduce emissions. The framework included a technical readiness assessment and consultations with industry. Canada maintained awareness of strategies undertaken in other jurisdictions, including individual provinces and the United States. Canada is also examining several proposed U.S. EPA rulemakings — the “Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles – Phase 3” and “Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles” — in accordance with its commitment to align with the most stringent emission standards in North America.

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

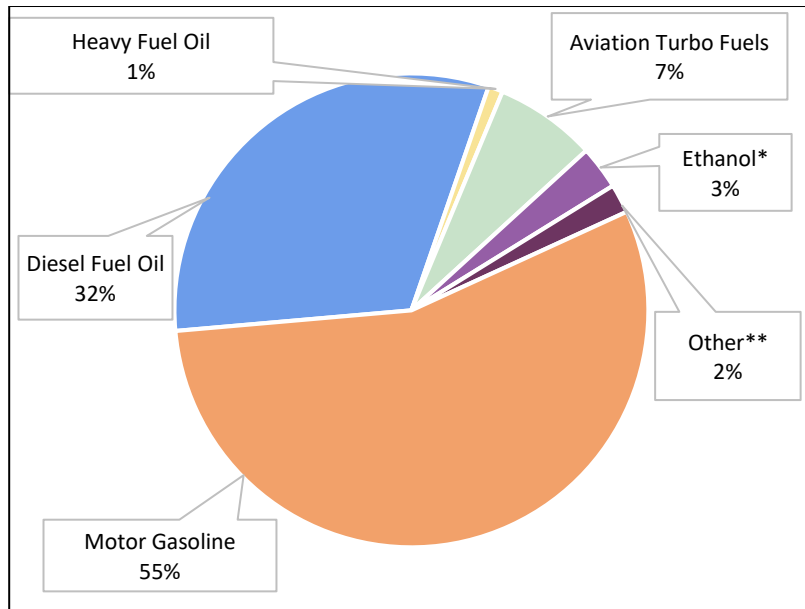
The [Pan-Canadian Framework](#) is the federal, provincial, and territorial plan to grow the economy, reduce GHG emissions, and build resilience in the face of a changing climate. The PCF includes more than 50 concrete actions that cover all sectors of the Canadian economy and puts Canada on a path to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

**Hydrogen Strategy for Canada**

Natural Resources 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 LDVs, buses, trucks and equipment, rail, marine, and aviation.

**Advanced Motor Fuels Statistics**

Figure 1 shows [energy use by fuel type](#) in 2020 for transportation in Canada. Table 2 lists supply and demand for ethanol and biodiesel.



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

\*\*Includes electricity, natural gas, biodiesel fuel oil, light fuel oil, aviation gasoline, and propane.

Figure 1. Fuel Mix of the Canadian Transportation Sector, 2020

Table 2. Canadian Supply and Demand of Biofuels, 2022 (in millions of liters)

Parameter	Ethanol	Biodiesel
Canadian production	1,692	369
Imports	1,752	846
Exports	82	379
Domestic use	3,343	1,052

Transportation GHG emissions (from passenger, freight, and other forms of transport) increased 5% from 2020 to 2021, reflecting a rebound since the first year of the pandemic. Despite the increase, transportation emissions were 12% below their pre-pandemic level in 2019.

## Research and Demonstration Focus

### ecoTECHNOLOGY for Vehicles (eTV) Program

The [eTV Program](#), conducted through Transport Canada's Innovation Centre, 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, compressed natural gas (CNG), and hydrogen fuel cell vehicles.

### Program of Energy Research and Development (PERD)

NRCan's [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 technologies that will help reduce the carbon footprint of fuels, improve the efficiency of vehicles, electrify transport, and reduce 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 2023, a total of 1,051 electric, hydrogen, and natural gas stations have been opened.

### Zero Emissions Vehicle Infrastructure Program (ZEVIP)

NRCan's [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.

### Electric Vehicle Infrastructure Demonstration Program (EVID)

NRCan's \$76 million [EVID](#) program supports the demonstration of next-generation and innovative EV charging and hydrogen refuelling infrastructure. Projects address technical and non-technical barriers and gaps associated with installing, operating, and managing ZEV infrastructure.

### Energy Innovation Program: On-Road Transportation Decarbonization

In May 2023, NRCan launched a \$48 million [On-Road Transportation Decarbonization Call](#) for proposals to conduct research, development, and demonstration (RD&D) projects that address barriers to the uptake of zero-emission medium- and heavy-duty trucks, innovative infrastructure solutions to support ZEVs, and transportation system efficiency.

### 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 toward 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 LDVs on the road); 4.6 million by 2030 (about 16%); and 12.4 million 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 R&D 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).

#### **Green Freight Program (GFP)**

[The GFP](#) will help fleets reduce their fuel consumption and GHG emissions through fleet energy assessments, fleet retrofits, engine repowers, logistical best-practice implementation, and the purchase of low-carbon vehicles. To be considered for funding under the Repower activity, the applicant must submit a list of technologies/equipment, and the repower of eligible technologies must involve permanent modifications, demonstrate the capacity to reduce diesel consumption of MHDVs, and reduce GHG emissions by switching the fuel used to a lower-carbon alternative. Dual-fuel options are also eligible, including projects that involve replacing the engine and/or drivetrain.

### **Outlook**

As depicted in [Table 3](#), the Canadian transportation sector comprises several distinct subsectors, each exhibiting different trends during the projected period. GHG emissions from cars, trucks, and motorcycles are projected to decrease by 14 Mt between 2005 and 2030, while those for heavy-duty trucks and rail are projected to increase by 11 Mt.

Table 3. Transportation: GHG Emissions (Mt CO<sub>2e</sub>)

<b>Transportation Subsector</b>	<b>2005</b>	<b>2020</b>	<b>2030</b>	<b>Δ 2005 to 2030</b>
Passenger Transport	<b>90</b>	<b>80</b>	<b>78</b>	<b>-12</b>
Cars, light trucks, and motorcycles	82	73	68	-14
Bus, rail, and domestic aviation	8	6	10	1
Freight Transport	<b>60</b>	<b>70</b>	<b>70</b>	<b>11</b>
Heavy-duty trucks, rail	54	66	66	11
Domestic aviation and marine	5	5	5	-1
Other: recreational, commercial, and residential off-road transportation	<b>10</b>	<b>9</b>	<b>9</b>	<b>-1</b>
<b>Total</b>	<b>160</b>	<b>159</b>	<b>158</b>	<b>-2</b>

This table includes projections with additional measures using Environment and Climate Change Canada's Energy, Emissions and Economy Model for Canada.