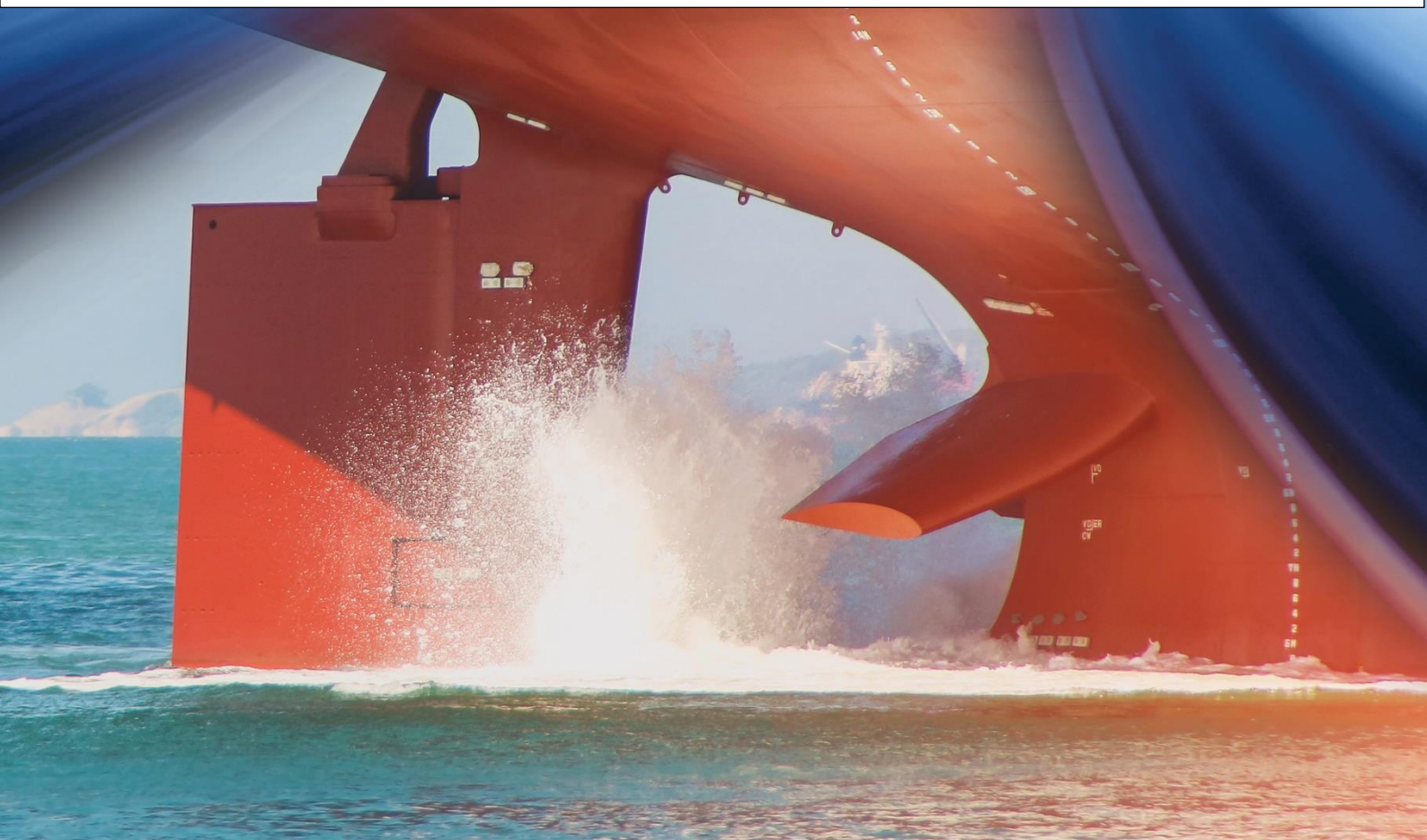


IEA-Advanced Motor Fuels ANNUAL REPORT 2021

Canada



Canada

Drivers and Policies

Clean Fuel Regulations (CFR)

Canada is developing regulations for cleaner fuels. When finalized, the proposed [Clean Fuel Regulations](#) would require liquid fossil fuel producers and importers to reduce the carbon intensity (CI) of the gasoline and diesel they produce in and import into Canada. The proposed regulations would also establish a credit market whereby the annual CI reduction requirement could be met via three main categories of credit-creating actions: GHG emission reduction projects that reduce the CI of liquid fossil fuels, supply of low-carbon fuels, and the fueling of advanced vehicle technologies. Parties that complete these actions (e.g., low-carbon fuel producers and importers) can participate in the credit market as voluntary credit creators. The proposed regulations would require that CI be reduced by 14 grams of carbon dioxide equivalent per unit of energy by 2030. Final [Clean Fuel Regulations](#) are targeted for the spring of 2022.

Renewable Fuels Regulations (RFRs)¹

The federal [RFRs](#) require fuel producers and importers to have an average renewable content of (1) at least 5% based on the volume of gasoline and (2) at least 2% based on the volume of diesel fuel and heating distillate oil that they produce or import into Canada. The regulations include provisions that govern the creation of compliance units, allow trading of these units, and also require recordkeeping and reporting to ensure compliance. When [Clean Fuel Regulations](#) is published, these volumetric requirements will be incorporated into those regulations and [Renewable Fuel Regulations](#) will be repealed. Alongside the federal policy, Canada has a variety of provincial renewable fuel policies which prescribe specific renewable fuels volumes. Ontario, Canada's most populous province, has a minimum 4% bio-based content in diesel and 10% bio-based content in gasoline, moving towards 15% in 2030.²

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 Standards³

Fuel Standards	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 2014, the second phase of action on light-duty vehicles (LDVs) for model years 2017 to 2025, with increasingly stringent GHG standards, was initiated. Under these published regulations, [Passenger Car and Light Truck GHG Emission Regulations](#), the average GHG emissions performance of new light duty vehicles decreased from about 302 g/mi in 2011 to about 245 g/mi in 2019, a reduction of about 19%. Canada completed a mid-term evaluation of the appropriateness of its standards for model years 2022 to 2025, 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 will work with both the U.S. and California to develop future LDV GHG regulations while intending to align with the most stringent LDV GHG tailpipe regulations in the U.S., be they at the federal or state level.

¹ <https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?Id=1031>

² <https://www.ontario.ca/laws/regulation/r20663>

³ <http://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html>

In 2018, the [Regulations Amending the Heavy-Duty Vehicle \(HDV\) and Engine Greenhouse Gas Emission Regulations](#) were published. 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.

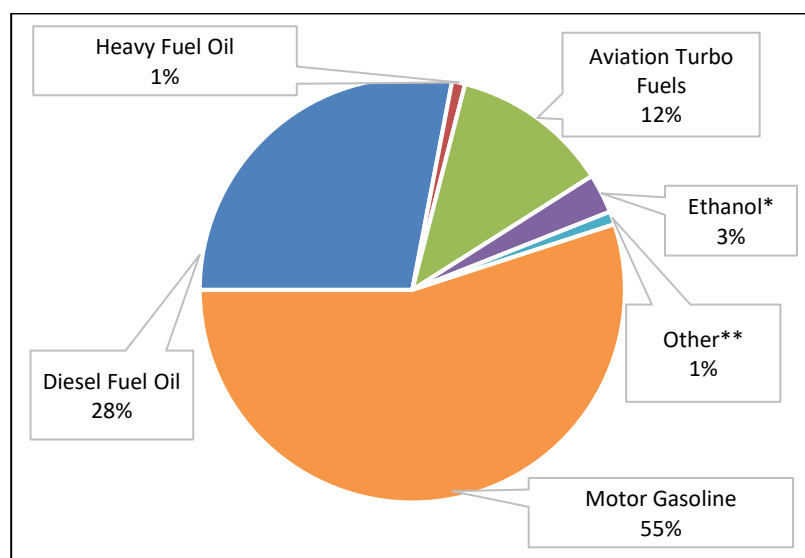
In December 2020, the Government of Canada announced its plan, [A Healthy Environment and a Healthy Economy](#),⁴ with a commitment to further improve the efficiency of heavy-duty vehicles standards for post-2025 by aligning with the most stringent standards in North America—whether at the U.S. federal or state level. The Government of Canada has recently launched discussions on a commitment to require 100% of medium- and heavy-duty vehicles sales to be zero emission by 2040, where feasible.

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 Canada's Paris Agreement GHG-emissions-reduction target of 30% below 2005 levels by 2030.

Advanced Motor Fuels Statistics⁴

Figure 1 shows energy use by fuel type in 2018 for transportation in Canada and Table 2 shows the supply of and demand for ethanol and biodiesel.



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

** The "Other" fuel type includes electricity, natural gas, aviation gasoline and propane.

Fig. 1. Fuel Mix of the Canadian Transportation Sector 2018

Table 2. Canadian Supply and Demand of Biofuels in 2019 (in millions of liters)

Parameter	Ethanol	Biodiesel
Canadian production	1,891	359
Imports	1,219	725
Exports	0	417
Domestic use	3,094	665

⁴ https://www.nrcan.gc.ca/sites/nrcan/files/energy/energy_fact/2021-2022/PDF/2021_Energy-factbook_december23_EN_accessible.pdf

Research and Demonstration Focus

ecoTECHNOLOGY for Vehicles (eTV) Program

Transport Canada'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)

NRCan continued to invest in the expansion of the network of electric vehicle (EV) charging and alternative refueling stations across Canada through [EVAFIDI](#). Funding will establish a coast-to-coast network of fast-charging stations along the national highway systems, natural gas refueling stations along key freight corridors and hydrogen refueling stations in major metropolitan areas.

Zero-Emissions Charging Station⁵

As of April 2021, NRCan has approved projects that will build 1,089 electric vehicle, 22 natural gas stations and 15 hydrogen stations. Almost half of these stations are already open to the public. Investments are also made to support the development of enabling codes and standards for vehicles and charging and refueling infrastructure.

Energy Innovation Program (EIP)

NRCan's [EIP](#) supports clean energy innovation both internally within government and externally with industry. Accelerating clean technology R&D is a key component of Canada's approach to promoting sustainable economic growth, reducing emissions including GHGs, and supporting Canada's 2050 clean growth targets.

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 Action Plan to Reduce GHG Emissions from Aviation

[Canada's Action Plan to Reduce GHG Emissions from Aviation](#) includes research and development to support the future use of sustainable aviation fuel. Within this plan, the Green Aviation R&D Network has several on-going projects focusing on bio-derived jet fuel applications for Canada.

Memorandum of understanding between the California Air Resources Board and Environment and Climate Change Canada

In 2019, California, the U.S. state with the strictest emissions regulations, and Canada signed a cooperation agreement to advance clean transportation. The [memorandum of understanding](#) commits to working together on respective regulations to reduce GHG pollution from vehicles, promote the uptake of cleaner vehicles, and share best practices related to cleaner fuels.

Clean Growth Program (CGP)

NRCan's [Clean Growth Program](#) is providing CAN 155 million (USD 123 million) investment in clean technology R&D and demonstration projects in three Canadian sectors: energy, mining and forestry.

Strategic Innovation Fund (SIF)

The [SIF](#), managed by Innovation, Science and Economic Development Canada, is provided to support Canadian businesses investing in innovation. The program helps offset costs related to researching and implementing new technologies, including the automotive sector.

⁵ [Zero-emission vehicle charging stations \(canada.ca\)](#)

Net Zero Accelerator Initiative (NZAI)⁶

Within the SIF, the NZAI will provide up to CAN 8 billion in support of projects that will enable Canada to reduce its domestic GHGs through projects that promote the decarbonization of large emitters, clean technology and industrial transformation and the development of a Canadian batteries ecosystem.

Incentives for Zero Emissions Vehicles Program⁷

Canada's accelerated zero-emission vehicle sales target will support the new 2030 climate reduction targets, which are 40-45% below 2005 levels. With light-duty vehicles remaining in service for about 15 years, requiring 100 percent of vehicles to be zero-emission by 2035 will also help put Canada on a path to achieving its long-term goal of net zero emissions by 2050. To help achieve these targets, Canada introduced a suite of new policy measures, including a federal purchase incentive program for eligible ZEVs.

Electric Vehicle Infrastructure Demonstration (EVID) Program

NRCan's [EVID program](#) supports the demonstration of next-generation and innovative ZEV charging and hydrogen refueling infrastructure. Over 20 demonstration projects are addressing key technical and non-technical barriers in a range of applications focusing on challenges to the implementation of EV charging infrastructure, such as bi-directional charging combined with energy storage, fast charging performance in the North and interoperability of electric bus charging infrastructure.

Outlook

As depicted in Table 3, the Canadian transportation sector is comprised of several distinct subsectors. Each subsector 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)⁸

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

* These projections are based upon the current emissions standards, which are in place for model years 2017 to 2025.

⁶ [Net Zero Accelerator Initiative - Strategic Innovation Fund](#)

⁷ [Building a green economy: Government of Canada to require 100% of car and passenger truck sales be zero-emission by 2035 in Canada - Canada.ca](#)

⁸ https://unfccc.int/sites/default/files/resource/br4_final_en.pdf