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Report Highlights:

Fossil fuel CI reduction requirements came into effect on July 1, 2023, but an early carbon credit creation mechanism operating June 2022 to June 2023 incentivized growth in ethanol use and blending in 2022 under Canada's CFR. Rising ethanol use and blending continued in 2023 supported by the carbon credit exchange and provincial policies, and the same was true for BBD in 2023 and expected in 2024. Fuel ethanol consumption in 2024 is forecast 43% higher than 2021 (pre-CFR) levels; biodiesel and renewable diesel are forecast 19% and 243% higher, respectively. The first of two HDRD plants began operation in November 2023, and HDRD exports to the United States began in June 2024. There is significant uncertainty for Canada's biofuel production and trade (especially BBD) given imminent changes in U.S. federal biofuel tax policy.

Acronyms

B.C. – British Columbia

CFR – Clean Fuel Regulations

CI – Carbon Intensity (a measure of how much carbon dioxide is released to produce a unit of fuel, calculated using a LCA tool)

CO₂ – Carbon Dioxide

BBD – Bio-based Diesel (biodiesel and renewable diesel)

BTC – Blenders Tax Credit

ECCC – Environment and Climate Change Canada

EPA – Environmental Protection Agency

HDRD - Hydrogenation-Derived Renewable Diesel (the only type of renewable diesel produced in large quantities today using animal fats and vegetable oils)

IRA – Inflation Reduction Act

LUB – Land Use and Biodiversity

LCA – Life Cycle Assessment

LCFS – Low Carbon Fuel Standard

RFS – Renewable Fuel Standard

RIN – Renewable Identification Number

ML – Million Liters

MT – Metric Tons

Section I. Exec Summary

After years of little change, ethanol and renewable diesel (HDRD-type) use and blending are up sharply. Year-over-year, an increasing proportion of energy demand is met by fuels with lower carbon intensities than the fossil fuels they replace, in large part because of Canada's Clean Fuel Regulations (CFR), which became law on July 6, 2022. Carbon-intensity (CI) reduction requirements in fossil fuels came into effect on July 1, 2023, but an early credit creation mechanism that occurred between June 21, 2022, and June 30, 2023, incentivized growth in ethanol blend rates in 2022, and later blend rates for biomass-based diesel (BBD).

FAS/Ottawa forecasts a 43% increase in fuel ethanol consumption over 2021 (pre-CFR) levels, driven by the CFR, a regulation that boosts ethanol consumption across the country by incentivizing the use of lower CI fuels like ethanol by providing credits to the suppliers who blend it into gasoline, thereby increasing demand for ethanol to meet requirements. Increased consumption is also driven by new blend rate requirements in Ontario and Quebec (the most populated provinces in Canada), and B.C.'s LCFS, which works similarly to the CFR by incentivizing the use of lower-CI fuels like ethanol to meet requirements.

Fuel ethanol imports grew significantly due to the CFR's early credit creation mechanism that took effect in 2022 and CI-reduction requirements that came into effect in 2023. Imports increased 39% year-over-year (y/y) in 2022, and another 40% y/y in 2023. FAS/Ottawa forecasts a marginal drop in imports 2024 y/y, as well as a decline in the total gasoline pool. Ethanol imports as percent of consumption averages 42% for the period 2015 to 2022. In 2023, that share elevated to a record 59% in 2023. Canada is the second largest ethanol importer in the world, and nearly all these imports come from the United States.

In 2024, biodiesel consumption is forecast to increase by 19%, and renewable diesel by 243%, on CFR obligations on fuel suppliers and blend rate requirements in Ontario and Quebec. Canada's biodiesel sector is extremely responsive to U.S. regulation with virtually all imports arriving from the United States. Notable influences on Canadian biodiesel investment and sales decisions are the U.S. Blenders Tax Credit (BTC), and U.S. RIN values (Canadian biodiesel generates RINs because the U.S. EPA approved their production pathways to meet RFS renewable fuel obligations).

As a share of the diesel pool, biodiesel consumption has stagnated through the years, but increased marginally in 2023 to a level that expected to be sustained in 2024. HDRD consumption as a share of the diesel pool saw a two-percentage point increase in 2023 and a forecasted additional two percentage point increase in 2025. Further, Canada has for a long time seen the highest use of HDRD as a share of total bio-based diesel (BBD – biodiesel and renewable diesel), running an average 52% for the period 2015 to 2022. HDRD's share of BBD has since skyrocketed to 62% in 2023 and a forecasted 77% in 2024.

HDRD consumption is surpassing biodiesel because it does not require a separate supply chain (and its associated cost) and it is advantaged over biodiesel for its relatively lower CI score. HDRD is favored in urban areas as it is a cleaner fuel with less toxins than diesel and biodiesel. And, finally, HDRD performs like fossil diesel much better than biodiesel in Canada's cold climate.

Canada began producing renewable diesel for the first time with its first facility coming online in November 2023, and a second in February 2024. With this new domestic supply, Canada exported renewable diesel for the first time in June 2024, to the United States. Exports are expected to ramp up in the final months of the year as industry takes advantage of the U.S. blenders tax credit (BTC) which expires in mid-December.

There is significant uncertainty in the BBD market – changes in U.S. federal tax credits will have implications for North American biofuel production and U.S.-Canada trade.

Section II. Policy and Programs

Renewable Energy and Greenhouse Gas Emissions

Canada Energy Regulator (CER) [states](#) that Canada's GHG emissions in 2022 (the most recent year available) were 707.8 megatons (Mt) of carbon dioxide equivalent (MT CO₂e). By contrast, GHG emissions in 2021 were 672.4 MT CO₂e. In 2022, Canada's emissions are 16.5% over 1990 levels and 7.1% below 2005 levels. Canada's 2023 National Inventory Report on GHG Emissions states that transportation was the second largest emitter of GHG emissions in 2022, with 156.3 MT CO₂e.

In a June 2022 [news release](#), Environment and Climate Change Canada (ECCC) stated that “the CFR will help cut up to 26.6 million tons of greenhouse gas pollution in 2030.” Canada submitted its revised [Nationally Determined Contributions](#) (NDC) under the Paris Agreement in July 2021, which included a target to reduce greenhouse gas (GHG) emissions by “at least” 40 to 45 percent below 2005 levels by 2030. [The Canadian Net-Zero Emissions Accountability Act](#), which became law on June 29, 2021, states that the government is committed to achieving net-zero emissions by 2050.

Canada supports the Agriculture Innovation Mission for Climate (AIM for Climate), a five-year (2021-2025) initiative co-led by the United States and the United Arab Emirates launched at COP26. that seeks to “enable global partnerships and solutions at the intersection of agriculture and climate change. On the sidelines of the AIM for Climate bilateral meeting on May 9 in Washington, Canada's agriculture minister Marie-Claude Bibeau met with U.S. Secretary of Agriculture Tom Vilsack and discussed the concerns that agricultural sectors in both countries have expressed about the CFR.

Under the United Nations Framework Convention on Climate Change (UNFCCC), Canada prepares and submits to the Secretariat a [National Inventory Report on GHG Emissions](#) on an annual basis, a [Biennial Report](#) on Canada's progress in achieving emission reductions and provisions of financial, technology,

and capacity building support to developing countries, and a quadrennial [National Communications](#) report.

In September 2023, the G20 leaders launched the Global Biofuel Alliance (GBA), led by India. The GBA's founding members include India, the US, Brazil, Argentina, Bangladesh, Italy, Mauritius, South Africa, and the United Arab Emirates, with Canada and Singapore participating as observer countries. To date, 19 countries and 12 international organizations have expressed their commitment to the GBA.

Federal Level Policy/Mandates

Clean Fuel Regulations: The main federal policy driving the biofuels market is the [Clean Fuels Regulation \(CFR\)](#), which became law on July 6, 2022. It limits the CI level of gasoline and diesel for each compliance period (2023 to 2030) and retains the minimum volumetric requirements from the previous regulation, the Renewable Fuels Regulations (RFR). The volume and CI obligations set by ECCC are the main drivers for overall biofuel growth rates because they obligate national consumption demand, while the “stacked support” from provincial policies and tax credits help bridge the cost gap with fossil fuels.

The CFR also regulates the minimum volumetric requirements of at least 5% low CI fuel content in gasoline and 2% low-CI fuel content in diesel fuel and light fuel oil. While important years ago when provincial blend rates were lower, upward adjustments at the provincial level more recently mean that federal mandates are now only seen as a safeguard measure that creates a minimum floor. While the national average blend levels are now well above, there are local geographies that remain at the minimal federal rates.

Canada has a federal carbon tax, applicable in provinces that do not have their own levy. Canada's carbon levy started in 2019 at CDN \$20 per ton and will reach CDN \$170 per ton in 2030. As of April 2024, it is CDN \$80 per ton. A regular increase in carbon taxes, is an effective way to ensure reduced emissions over the long term.

Carbon Credit Trading System: To meet the CFR's annual CI reduction requirements, primary suppliers of fossil fuel (the obligated party) must demonstrate compliance by either creating credits or buying carbon credits from other creators in Canada's new carbon credit market. Each carbon credit represents fuel lifecycle emission reduction of one ton of carbon dioxide equivalent. The credit trading system does not have any interactions with other trading systems.

Early credit creation was available for the period of June 21, 2022, to July 1, 2023. The first credit creation reports were due June 30, 2023, at which point ECCC (Environment and Climate Change Canada) received data on credits created for the 2022 compliance period. The coming into force date of CI limits was July 1, 2023.

The CFR requires fossil gasoline and diesel primary suppliers (producers and importers) to reduce the CI of the fossil gasoline and diesel they supply to Canada as indicated by the CI limits in Table 1 of this report.

Table 1: Fuel Carbon-intensity limits for each compliance period (gCO₂e/MJ)

Liquid Fossil Fuel	2023	2024	2025	2026	2027	2028	2029	2030
Gasoline	91.5	90.0	88.5	87.0	85.5	84.0	82.5	81.0
Diesel	89.5	88.0	86.5	85.0	83.5	82.0	80.5	79.0

Source: ECCC, CFR

The fuel carbon-intensity limit for gasoline will reach 81.0 gCO₂e/MJ by 2030. Canada estimates that about 2.2 billion liters of additional low-carbon-intensity diesel and 700 million liters of additional ethanol will be needed by 2030 under the CFR.

The federal government published carbon credit prices in June 2023 in their first and only [Credit Market Report](#) to date. Average credit price in 2022 is CDN \$141.80 (an average of 77 transfers of compliance credits) and in 2023 it was CDN \$127.30 (with an average of 163 transfers).

The Regulations establish a compliance credit market whereby the annual CI reduction requirements can be met by creating credits through three categories of actions:

Compliance Category 1 – projects that reduce the life cycle CI of liquid fossil fuels (e.g. carbon capture and storage, on-site renewable electricity);

Compliance Category 2 – supply of low-carbon-intensity fuels (e.g. ethanol, biodiesel); and,

Compliance Category 3 – supply of fuel or energy to advanced vehicle technology (e.g. electricity or hydrogen in vehicles).

U.S. suppliers do not create credits unless they import the fuel into Canada. Only registered participants are credit creators. Foreign suppliers are only responsible for the CI that they produce. By lowering their CI, suppliers make their product more attractive to registered participants.

Life Cycle Assessment Model: The [Fuel Life Cycle Assessment \(LCA\) Model](#) is a tool used to calculate the lifecycle CI of fuels and energy sources used and produced in Canada. The model was developed for the CFR by a third-party contractor.

An overview of the main changes made to the *Fuel LCA Model, Specifications and Data Workbook* for the June 2024 publication are available [here](#).

[National average CI values](#) are published in Canada's first credit market report, published in June, 2024.

Environmental Sustainability and Certification: Canada has [land use and biodiversity \(LUB\) criteria](#) that currently apply to domestically grown and imported feedstocks. The objective of the LUB criteria is to minimize negative environmental impacts from harvested or cultivated feedstock used in the production of low-carbon feedstocks.

To ensure that all the applicable eligibility requirements demonstrating that the feedstock meets the LUB criteria are documented, and the compliance credits being allocated to the low-carbon feedstock producer are accurate, traceability methods need to be in place throughout the supply chain, which includes the completion and tracking of farmer declaration forms through the supply chain.

On November 9, 2023, Environment and Climate Change Canada (ECCC) publicly announced that it approved the U.S. application for [legislative recognition](#) which demonstrates that U.S. feedstock is in compliance with the LUB criteria under the CFR.

Without legislative recognition, individual farmers or states would have had to prove their own compliance, as of January 1, 2024, the coming into force date for renewable fuel feedstocks to meet LUB criteria. With the approval of the U.S. application, Canada acknowledges that U.S. feedstocks are in compliance with the wildlife habitat and damaging agents sections of the LUB criteria and can generate credits under the CFR.

Exporters to Canada are still required to complete [farmer declaration forms](#), despite aggregate compliance, just as Canadian industry does.

Biofuels are required to meet minimal GHG emissions reductions over their fossil fuel equivalent, which can vary by province and is specified in the provincial sections of this report, where they vary from federal government requirements.

Several reports require third-party verification, including annual credit creation reports for the supply of fuels, annual credit creation reports for CO₂e emission reduction projects, applications for a temporary approval of carbon-intensity for low carbon-intensity fuels, quarterly credit creation reports for the production or import of eligible low-carbon-intensity fuel, and [more](#).

Requirements Pertaining to Used Cooking Oil: In June 2024, ECCC's Low Carbon Fuel Division provided information on the LUB Criteria under the CFR with respect to Used Cooking Oil feedstock (UCO), specifically subsection 46(1)(b)(v) as it pertains to the Indirect Changes to Land Use criteria (subsection 50(1) of the *Regulations*).

For UCO feedstock, the low-CI fuel producer must demonstrate that the UCO feedstock they are sourcing is of Type 2 (i.e., meeting 46(1)(b)(v))) and therefore proving, with reasonable level of assurance, that it is a waste product coming out of an upstream processing operation.

The low-CI Fuel producer must ensure that collection points retain records of contracts, delivery records, invoices, etc. of where the UCO was sourced from.

It is not required for the low-CI producer to determine the specific composition of the originating material that the UCO mix is derived from (e.g., palm, corn, canola, etc.). Palm-derived UCO is something Canada supports and provides incentives for, as a fuel carbon credit generator. ECCC has yet to publicly state how it may account for not all UCO being used prior to its blending with other UCO, and what checks they may have in place for that.

The latest version of GHGenius, the LCA Tool used by B.C. and other provinces, includes palm oil.

Provincial Level Policy/Mandates

Mandates: Canada allows for various [provincial blending rates](#) amidst a federal backstop for blend rates, below which provincial rates cannot fall. Federal [Renewable Fuels Regulations](#) for gasoline came in effect in December 2010 at five percent renewable content, and diesel in July 2011 at two percent renewable content. These rates are retained under the CFR. Provincial regulations vary, while Newfoundland, the territories, and regions north of the 60-degree latitude are exempt.

The impact of provincial mandates on the national market varies to a considerable degree due to differences in market size. Ontario and Quebec continue to account for the largest share of national gasoline sales, with Ontario accounting for 37% in 2023 and Quebec accounting for 21%. Ontario and Alberta continue to account for the largest share of national diesel sales, with Ontario accounting for 30% in 2023 and Alberta accounting for 23%.

Table 2: Low carbon fuel mandates

Region	% low-carbon fuel content in gasoline	% low-carbon fuel content in diesel
Federal Backstop	5	2
Ontario	10	4
Quebec	10	3
British Columbia	5	4
Alberta	5	2
Saskatchewan	7.5	2
Manitoba	10	5

British Columbia (B.C.): In [Roadmap to 2030](#), the B.C. government states that it is committed to produce 1.3 billion liters per year by 2030.

Effective January 1, 2024, the [Low Carbon Fuels Act](#) replaced the Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act. The Low Carbon Fuels Act and its [regulations](#) are together known as B.C.'s Low Carbon Fuel Standard (LCFS).

The LCFS aims to achieve a 30 percent reduction in fuel CI by 2030, relative to 2010 levels. As a market transformation policy, the LCFS creates a financial incentive to reward the use of low carbon fuels in proportion to the amount of measurable greenhouse gas reductions they yield when substituted for conventional fuels.

The LCFS requires that those who market fossil-derived fuels meet [the following standards](#) each year:

- Gasoline minimum renewable volume is 5%
- Diesel minimum renewable volume is 4%
- Jet fuel minimum renewable volume is 0% in 2024-2027, 1% in 2028, 2% in 2029, and 3% in 2030 and subsequent compliance periods

The requirement of jet fuel is new to the 2024 LCFS Regulations. Canadian production capacity for sustainable aviation fuel is projected to grow significantly to be nearly 900 million liters per year in 2027, rising to nearly 2 billion liters per year by 2030, according to the B.C. government.

A further revision to the LCFS Regulations include an increased [penalty](#) for under-compliance per debit (per ton of CO₂ equivalent emitted), from CDN \$200 to CDN \$600. Therefore, in practice credits won't be transacted for over CDN \$600 and this acts as a price ceiling for the market. However, B.C.'s LCFS has no price ceiling on credits, it only dictates that credit transactions between registered parties must meet the criteria of "fair market value" and be approved by the B.C. government.

This sets it apart from California's LCFS, which has a Credit Clearance Market (CCM) that acts a clearinghouse for credits, matching any unbought but offered credits with buyers that still need to comply for the previous compliance period. The CCM has a price ceiling of USD \$200 set in 2016 and adjusted for inflation (LCFS Credit Clearance Market). The CCM is only established for a given compliance period if there aren't enough credits offered on the market. Then participants can pledge credits for other parties to buy through the CCM for that period. This acts as a soft price ceiling instead of participants having to pay a penalty when they under-comply.

B.C. LCFS credit prices held strong between CDN \$400 and \$500/t CO₂e for the past two years but suddenly dropped to CDN \$207 in July 2024, with only two transactions taking place that month. The 2024 monthly average YTD October credit price is CDN \$417.88, down from the 2023 monthly average of CDN \$471.82. [Credit market activity](#) is published on the provincial government's web site.

Tidewater, a renewable diesel company in B.C., offered its explanation of the low July price, in its August 2024 financial statement:

This sharp decline in B.C. LCFS credit prices is believed to be a function of large volumes of subsidized U.S. renewable diesel physically moving out of the oversupplied U.S. renewable fuel market and into the higher value B.C. market. Aggravating the situation is, in management's view, overlapping U.S. and Canadian low carbon fuel policies which allow U.S. renewable diesel producers to take advantage of U.S. and state compliance credits, which are generated at the point of production, then import their volumes to Canada and generate B.C. LCFS emission credits at the point of sale.

To encourage producers to apply for specific carbon intensities, the LCFS Regulations sets a precautionarily high default CI for each fuel type recognized by the regulation.

Fuel producers may apply for a unique CI based on the specific lifecycle parameters (aka. feedstock-production technology-fuel “pathway”) of the fuel they produce. Once the CI is approved, anyone who supplies that fuel must use the approved CI and corresponding B.C. low carbon fuel code. For the current list of approved carbon intensities and fuel pathway codes, see: [RLCF-012: Approved Carbon Intensities - Current](#).

Hydrogenation-Derived Renewable Diesel (HDRD) continues to be the largest [credit creator](#) in the B.C. LCFS, followed by ethanol and then biodiesel.

B.C. is progressive in its carbon tax policy which, when it went into effect in 2008, was North America’s first broad-based carbon tax. The provincial tax rate matches the federal carbon tax rate, which rose to CDN \$80 per ton of emissions in April 2024, and is scheduled to rise to CDN \$170 by 2030. In B.C., the motor fuel tax and carbon tax apply to renewable fuels as follows:

- Ethanol at the same tax rates as [clear gasoline](#)
- Biodiesel, renewable diesel and straight vegetable oil (SVO) at the same tax rates as [clear diesel \(light fuel oil - diesel\)](#)

Ontario: The Cleaner Transportation Fuels regulation requires that fuel suppliers blend 10% of renewable content in gasoline from 2020 to 2024. The renewable content requirement increases to 11% in 2025, 13% in 2028, and 15% in 2030 and onwards. The renewable content must emit fewer greenhouse gas emissions than fossil gasoline on a lifecycle basis by 45% before 2030 and 50% from 2030 onward. The regulation also requires fuel suppliers to continue to blend 4% renewable content in diesel. This renewable content must emit 70% fewer greenhouse gas emissions than fossil diesel on a lifecycle basis.

Quebec: A [mandate](#) (French language only) for incorporating clean fuels into gasoline and diesel came into effect in Quebec on January 1, 2023 under Quebec’s *Regulation Respecting the Integration of Low-CI Fuel Content into Gasoline and Diesel Fuel*. Quebec required 10% low-carbon fuel content in

gasoline (it is not required to be ethanol, although most of it will be) as of January 2023 and will require 12% as of January 2025, 14% as of January 2028, and 15% in January 2030.

Low-carbon fuel content in diesel began at 3% in 2023 and will increase to 5% in January 2025 and 10% in January 2030.

Alberta: Alberta's Renewable Fuels Standard requires a minimum annual average of 5% renewable alcohol in gasoline and 2% renewable diesel in diesel fuel sold in Alberta by fuel suppliers. Alberta has no schedule for future mandate increases. To meet the Renewable Fuels Standard, renewable fuels must demonstrate at least 25% fewer GHG emissions than the equivalent petroleum fuel. As Canada's major producer of petroleum and petroleum products, Alberta has set the least ambitious use requirements for biofuels and has actively challenged in court federal efforts to establish the carbon tax for fossil fuels.

In February 2020, the Alberta Court of Appeal found the federal carbon tax to be unconstitutional, concluding that the federal government had no right to encroach upon provincial jurisdiction. The following year, a majority at the Supreme Court of Canada overturned that conclusion, instead confirming decisions from the Ontario and Saskatchewan courts of appeal that held the carbon tax a permissible exercise of the federal government's residual "Peace, Order, and good Government" power under section 91 of the Constitution Act 1867.

Manitoba: Beginning January 1, 2008, the Ethanol Mandate required fuel suppliers in Manitoba to replace at least 8.5% of their gasoline with ethanol, which on Jan 1, 2022 was raised to 10%. The Biodiesel Mandate started on November 1, 2009, which required fuel suppliers to blend 2% renewable content in both on and off-road diesel fuel, which was raised to 5% effective January 1, 2022.

Saskatchewan: The province's Ethanol Fuel Regulation requires 7.5% ethanol in the gasoline pool as of January 1, 2008. The Renewable Diesel Act, effective July 1, 2012, requires fuel distributors to include 2% renewable diesel content.

Canadian Industry Concerns about Changes to U.S. Federal Tax Credits and California's LCFS

The Clean Fuel Production Tax Credit (45Z) is a tax credit established by the U.S. Inflation Reduction Act (IRA) and becomes available on January 1, 2025. It is administered by Treasury and is currently scheduled to be available through December 31, 2027. 45Z replaces the current U.S. blenders tax credit (BTC) that has applied to BBD for many years and sunsets at the end of the 2024 tax year.

Industry is eagerly awaiting publication of Treasury guidance 45Z, as well as a USDA voluntary standard under development for agricultural biofuel feedstocks. The Government of Canada and industry fear that 45Z may disadvantage Canadian feedstocks at a particularly sensitive time for its

oilseeds industry¹. Further, Canadian renewable fuel companies have expressed concerns that 45Z will make Canadian fuels uncompetitive with U.S.-made fuel.

Industry is also concerned that changes to California's LCFS will limit future opportunities for Canadian canola oil and Canadian biofuels produced with canola oil, by limiting future volumes of vegetable oil used to produce biofuels in the California market.

These are exciting times for the newly emerging HDRD industry, but also one saddled with exceptional risk. Seven additional renewable diesel facilities are planned, or under construction, in Alberta, B.C., and Quebec. These facilities would add up to 4.07 billion liters per year of production by 2027. However, there is considerable downside risk to this potential scenario and most of that centers around U.S. federal biofuels policy, EPA's future RVO-setting after 2025, and the IRS biofuel tax credit policy. The shift from a blender's tax credit to a producer's tax credit threatens to alter U.S.-Canada trade flows and not only for BBD but also ethanol as ethanol is also covered under the 45Z. Both the RVOs and IRS tax credits are vulnerable to changing U.S. Administrations. Economic conditions and future changes in the Canadian federal and provincial financial supports are also in play.

Financial Supports

Federal Level

Sources state that a renewable fuel strategy will be outlined in Canada's 2024 Fall Economic Statement, a report usually published in October of each year. However, this year it will reportedly be reduced to statements made in December.

Federal supports are heavily geared to supporting advanced biofuels not yet commercialized and novel feedstock including the use of CO₂ and other chemicals to make eFuels.

At the federal level, a [biofuels production fund](#) has been created to support competitive production of clean fuels in Canada.

The Canadian Infrastructure Bank (CIB) will invest at least CDN \$500 million in biofuel production under its green infrastructure investment stream. In May 2023, the CIB concluded the financing on its first project from its low-carbon fuels, carbon capture utilization storage and hydrogen initiative with support for a biorefinery and the country's largest electrolyzer.

Under the terms of the agreement, the CIB will provide a loan of CDN \$277 million to a joint-venture partnership between Shell, Suncor, Proman, and the government of Québec that will enable construction of Canada's largest biorefinery, based on a technology platform developed by Enerkem.

¹ In September 2024, China announced an anti-dumping probe into Canadian canola

In August 2023, it was [announced](#) that Canada would invest “up to CDN \$5.3 million” to BioFuelNet (BFN) Canada under the AgriScience Program Clusters Component, part of the [Sustainable Canadian Agricultural Partnership](#). The objective of the Biomass Cluster is to help expand and invigorate Canada's bioeconomy through the development of biomass supply chains and cutting-edge technologies to produce biomass and value-added agricultural products.

The cluster has proposed research activities under three themes: Biomass Production, Biomass Feedstock Supply Chains, and Biomass Utilization. The research activities include: growth of biomass crops on marginal lands, the development of microbial biostimulants, and various conversion technologies.

The Sustainable Canadian Agricultural Partnership is a five-year, CDN \$3.5-billion investment by Canada's federal, provincial and territorial governments that supports Canada's agri-food and agri-product sectors. This includes CDN \$1 billion in federal programs and activities and a CDN \$2.5 billion commitment that is cost-shared 60% federally and 40% provincially/territorially for programs that are designed and delivered by provinces and territories.

The investment was used by at least one renewable fuel project, Azure Sustainable Fuels Corp.'s Front End Engineering Design (FEED) study for sustainable aviation fuel (SAF). Further information on this project is below, in the Manitoba section.

Provincial Level

Alberta: Alberta's government provides a 12% nonrefundable tax credit to corporations investing at least C\$10 million to build/expand an agri-processing facility. Up to CDN \$175 million in tax credits is available for each project. Corporations have ten years to claim the tax credit.

Alberta has provided an [Agri-Processing Investment Tax Credit to Imperial Oil Ltd.](#) for a CDN \$720 million project to build the nation's largest renewable diesel facility with capacity to produce one billion liters per year.

Quebec: Quebec has a [production tax credit](#) for ethanol, cellulosic ethanol, biodiesel fuel, as well as for the production of other low-carbon-intensity fuels produced from eligible materials, except for biofuels used to power aircraft, boats, or ships.

A qualified corporation can claim this tax credit in respect of eligible biofuels that it produces in Québec for sale and use in Québec, up to a maximum of 300 million liters per year. The newest tax credit replaces an expired credit and will be available from April 1, 2023 to March 31, 2033.

The rate of the tax credit is determined according to various factors so that the level of tax assistance applicable to an eligible biofuel produced by a qualified corporation will increase according to the decrease in CI observed for that biofuel compared to the gasoline or diesel fuel that it replaces.

[Support policies](#) for electric vehicles will have some impact in years to come. Quebec's [Zero Emission Vehicle Standard](#) regulates annual zero emissions light-duty vehicle sales targets reaching 100% in 2035. Quebec's enormous hydro-power resources favorably positions battery electric mobility solutions and eventually the production of eFuels.

British Columbia: The [LCFS Initiative Agreement](#) program helps undertake actions that are not otherwise economically viable, and that will help create pathways for businesses to comply with the LCFS. The Initiative Agreement program allocates up to 25% of the previous compliance year's debits; reviews applications from anyone in B.C. for eligible actions; grants LCFS credits to successful applicants for complete action. Projects supported under the Initiative Agreement are described [here](#). Previously, this support fell under B.C.'s "[Part Three Agreements](#)" program, which provided funding to in-province and out-of-province projects (e.g. Imperial Oil in Alberta).

Manitoba: Manitoba is [contributing CDN 2.9](#) million to a Federal-Provincial cost-share program to fund an Azure Sustainable Fuels Corp. study that will provide plans for using Canadian feedstock products such as canola and soybean oils to produce as much as an estimated one billion liters of sustainable aviation fuel (SAF) per year. The FEED study will ensure engineering, efficiency and development needs are met, prior to construction.

The mission of this project is to provide a made-in-Canada solution to source certified low carbon fuels to meet their emissions reduction targets.

Section III. Ethanol

Table 3: Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 ^f
Production	1,820	1,860	1,851	1,873	2,013	2,200	2,100	-	-	-
Fuel Production	1,721	1,739	1,728	1,748	1,881	1,690	1,719	1,774	1,787	1,840
Imports	1,224	1,192	1,251	1,346	1,283	1,289	1,385	-	-	-
Fuel Imports	1,088	1,113	1,216	1,233	1,219	1,163	1,254	1,752	2,461	2,350
Exports	68	76	88	73	83	143	178	-	-	-
Fuel Exports	0	0	0	0	9	75	108	82	72	99
Consumption	2,976	2,976	3,053	3,263	3,213	3,346	3,307	-	-	-
Fuel Consumption	2,809	2,852	2,944	2,981	3,091	2,778	2,865	3,444	4,176	4,091
Refineries Producing Fuel Ethanol (Million Liters)										
Number of Refineries	15	14	13	12	12	12	12	12	12	12
Nameplate Capacity	1,800	1,750	1,750	1,822	1,881	1,881	1,881	1,881	1,881	1,881
Capacity Use (%)	95.6%	99.4%	98.7%	95.9%	100.0%	89.8%	91.4%	94.3%	95.0%	97.8%
Co-product Production (1,000 MT)										
DDGs	1,306	1,317	1,311	1,332	1,274	1,274	1,265	1,280	1,314	1,330
Corn Oil	6	10	10	10	-	-	-	-	-	-
Feedstock Use for Fuel Ethanol (1,000 MT)										
Grain	4171	4207	4189	4254	4,561	4,054	4,072	4,260	4,260	4,400
Corn	3,405	3,577	3,411	3,884	4,102	3,352	3,770	3,700	3,700	-
Wheat and other grains	766	630	778	370	459	552	302	560	560	-
Market Penetration (Million Liters)										
Fuel Ethanol Use	2,809	2,852	2,944	2,981	3,091	2,778	2,865	3,444	4,176	4,091
Gasoline Pool 1/	47,720	49,276	49,717	51,169	50,876	42,878	44,575	45,696	46,363	45,094
Blend Rate (%)	5.9%	5.8%	5.9%	5.8%	6.1%	6.5%	6.4%	7.5%	9.0%	9.1%

Note: 1/ Covers gasoline and all biocomponents (biofuels) like ethanol and ETBE as well as MTBE if used; Totals include ethanol beverages. See Section VI. notes on statistical data.
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Consumption: As the gasoline fuel industry reduces CI and raises ethanol blend rates, fuel ethanol consumption has ramped up, beginning in 2022. Nationwide CI reduction requirements for liquid transport fuels did not come into effect until July 1, 2023, but the early credit creation mechanism that occurred between June 21, 2022 and June 30, 2023 incentivized growth in blend rates in 2022.

In 2023, the national average blend rate increased to 9%, up from 7.5% in 2022, as a direct result of the CFR. Based on YTD production and trade data, FAS/Ottawa is forecasting the average blend rate to increase by one percentage point but overall fuel ethanol consumption to fall by 2% from 2023 to 2024, based on an International Energy Agency (IEA) forecast of a shrinking fuel pool.

The majority of the growth in fuel ethanol consumption is occurring in the most populated provinces: Ontario, Quebec, and B.C..

Production: Fuel ethanol production is forecast to increase 3% year-over-year in 2024 to 1.84 billion liters with imports slightly down and continued European demand. FAS/Ottawa includes undenatured fuel ethanol production in its fuel ethanol estimate, although final end use is uncertain but export levels are inconsequential to the balance.

Fuel ethanol capacity is unchanged from last year. However, Husky's two ethanol facilities now operate as Cenovus after Husky and Cenovus [combined assets](#) in 2021.

There are currently 12 facilities producing fuel ethanol, with a combined capacity of 2,015 ML. However, some of this capacity is dedicated to non-fuel end uses which explains the lower capacity figures tracked in Table 3.

Fuel ethanol feedstocks primarily consist of Ontario and Quebec-grown corn. Wheat is likely the distant second-largest type of feedstock used.

Imports: Fuel ethanol imports are forecast to fall slightly in 2024 over the previous year on a forecasted reduction in the gasoline pool and a marginal to no rise in the national average blending rate. Year to date in August, fuel ethanol imports are down 3% over the same period in the previous year.

In 2023, ethanol imports increased over the previous year, driven by the CFR. Industry sources indicate that facilities in upper tier states were diverting their ethanol away from Washington State and Oregon to Canada because the CFR made it more profitable.

Data from ECCC's June 2024 [credit market report](#) (its first and only to date) indicates that while fuel ethanol import volumes were 41% higher than domestic supply, credits created were 1% lower.

Exports: In 2023, exports of undenatured fuel, primarily to Europe, fell 13% year-over-year to 71 ML. Undenatured fuel makes up nearly 100% of total fuel ethanol exports. Year-to-date in September 2024, exports have risen 38% over the same period in the previous year, to 58 ML. FAS/Ottawa forecasts overall 2024 fuel exports to grow from 2023 levels, on strong demand and a shift of resources to the production of undenatured product.

Canada is not an exporter of denatured fuel ethanol to the United States because among other factors, unlike biodiesel, ethanol does not receive a BTC in the United States. Most fuel ethanol produced in Canada is consumed domestically with a tiny fraction shipped more recently to Europe.

Section IV. Biodiesel/Renewable Diesel

Table 4: Biodiesel (FAME) & Renewable Diesel (HDRD), Million Liters

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024(f)
Biodiesel (Million Liters)										
Production	397	464	397	308	359	458	431	369	496	460
Imports	281	262	300	391	344	384	422	400	547	541
Exports	267	455	350	309	342	451	441	379	518	510
Consumption	411	271	347	390	361	391	412	390	525	491
Renewable Diesel (Million Liters)										
Production	0	0	0	0	0	0	0	0	14	687
Imports	224	261	411	358	380	500	472	380	851	1,382
Exports	0	0	0	0	0	0	0	0	0	450
Consumption	224	261	411	358	380	500	472	380	865	1,619
Biodiesel + Renewable Diesel (Million Liters)										
Production	397	464	397	308	359	458	431	369	510	1,147
Imports	505	523	711	749	724	884	894	780	1,398	1,923
Exports	267	455	350	309	342	451	441	379	518	960
Consumption	635	532	758	748	741	891	884	770	1,390	2,110
Biodiesel Production Capacity (Million Liters)										
Number of Plants	9	9	9	11	11	10	10	10	9	9
Nameplate Capacity	400	550	591	678	704	686	686	686	671	671
Capacity Use (%)	99%	84%	67%	45%	51%	67%	63%	54%	74%	69%
Renewable Diesel Production Capacity (Million Liters)										
Number of Plants	0	0	0	0	0	0	0	0	1	2
Nameplate Capacity	0	0	0	0	0	0	0	0	170	994
Capacity Use (%)	-	-	-	-	-	-	-	-	8%	69%
Feedstock Use for Biodiesel + Renewable Diesel (1,000 MT)										
Vegetable oils 1/	245	285	232	171	227	292	310	282	394	950
Tallow and UCO	110	130	130	110	100	125	82	44	63	72
Market Penetration, Biodiesel + Renewable Diesel (Million Liters)										
Diesel Pool 2/	33,896	31,928	34,902	35,946	34,688	30,930	32,309	33,527	32,726	31,200
Blend Rate (%)	1.9%	1.7%	2.2%	2.1%	2.1%	2.9%	2.7%	2.3%	4.2%	6.8%

Note: 1/ Vegetable oils includes canola oil (primary) and soy oil

f-forecast

Note: 2/ Covers diesel and all biocomponents (biodiesel) and renewable diesel when used. Source IEA/Paris, June 2024 data.

Consumption: In 2023, as a direct result of the CFR, biodiesel and HDRD use rose sharply boosting the national average BBD (biodiesel plus HDRD) blend rate from an estimated 2.3% (2022) to 4.2% (2023). The blend rate continues to surge and is forecast to reach 6.8% in 2024, primarily on significantly increased HDRD use of renewable diesel made possible by the first ever supply of domestic production and a second year of sharply higher imports from the United States.

Consumption of HDRD in 2024 is forecast to be four times larger than 2022 levels, driven by the CFR. The largest consumers are Ontario, Quebec, B.C., and Alberta, due to population size. Among all countries, Canada has always had the highest penetration rate of HDRD in total renewables used in the diesel pool at or near 50% as early as ten years ago. Today, supported by sharply higher imports and the first ever domestic production, HDRD of total BBD use in the diesel pool has reached an estimated 77%.

Production: Biodiesel production has seen some decline and then recover over the past decade and today production is estimated no higher than it was back in 2016. Production is largely dependent on sales opportunity in the United States with most production moving south across the border since Canadian biodiesel meets U.S. RVOs, can thus generate RINs, and even share part of the \$1/gallon U.S. BTC through contractual arrangements. In 2023, biodiesel production increased 34% to a record estimated 496 million liters on strong U.S. demand. Some plants announced plans to ramp up biodiesel production at this time. For example, in the summer of 2023 Canary Biofuels in Alberta reportedly announced plans [to ramp up production](#) to full capacity (76 ML) in September, in line with its plant optimization process. Earlier in the year it was reportedly operating at 60% to 70% capacity.

There are nine biodiesel plants in Canada but as in recent years only six are currently operational. The six have a total capacity equaling 601 ML. Year 2023 production reached 74% of this capacity. Two facilities were removed from the list of total plants (operating and shuttered) as of 2023 which accounts for adjustments from last year's report; one facility was refurbished to produce products other than biodiesel, and the other was dismantled.

Biodiesel production estimates from January 2020 onward reflect revisions made by Statistics Canada, as described further in the Statistical Notes of this report.

Turning to HDRD, FAS/Ottawa forecasts 2024 HDRD production to increase 48% from the previous year to 687 ML in 2024, up from zero in October 2023.

The implementation of the federal government's CFR has been one of the main drivers unlocking investments used to build Canada's first HDRD plants. Canadian commercial production of HDRD began November 7, 2023 with the Tidewater facility in B.C. coming online (capacity: 170 ML). A second facility, Braya, began operation in Come By Chance, Newfoundland in February 2024 (planned capacity: 824 ML). A third facility in Alberta, owned by Imperial Oil, is expected to come online in early 2025.

Tidewater: In a [financial statement](#), Tidewater stated that for the nine months ended September 30, 2024, the HDRD company achieved average utilization of 150 ML, representing 88% of design capacity, and the corporation expects full year utilization to exceed the previously announced target of 145 ML, representing 85% of design capacity. Feedstocks to date include canola oil.

Braya: Braya [has future plans to expand](#) its HDRD production capacity, add sustainable aviation fuel production capabilities, and explore green hydrogen production. It's feedstocks to date have included Argentine soybean oil.

Imperial Oil: Strathcona, Alberta is scheduled to soon be home to Canada's largest-producing HDRD facility, which is expected to have a capacity of more than one billion liters by early 2025. It will use canola oil feedstock and hydrogen from natural gas with carbon capture and storage (CCS). Imperial Oil said it expects to capture and store about 500,000 MT of CO₂ each year. The blue hydrogen and feedstock will be combined with a proprietary catalyst to produce HDRD.

Imports: Biodiesel imports increased 37% in 2023 y/y, on demand driven by the CFR, backfilling exports to the United States. Official data from Statistics Canada data shows that biodiesel import volumes are down 13 percent year-to-date September 2024, compared to the same period in the previous year. Imports are forecast to close the year close to 2023 levels.

In 2023, Canada imported 851 ML of HDRD, a more than two-fold increase y/y, making Canada the largest importer of U.S. HDRD, according to U.S. Census Bureau data. In that year, most imports were railed into Alberta.

In 2024, HDRD imports are forecast to increase more than 60% y/y. Cold weather diesel specifications are expected to limit physical imports of renewable diesel in the fourth quarter of 2024 (and first quarter of 2025).

According to Statistics Canada, in the years 2022 and 2023, the majority of HDRD imports from the United States came in via rail to Alberta (36%) and via water to B.C. (33%). YTD in October 2024, the majority of HDRD was imported via water to B.C. (34%), rail to Alberta (24%) and water to Quebec (also 24%).

Exports: Canada's biodiesel plants are export-oriented due to U.S. federal policy supports already mention. In any given year, 88 to 99 percent of Canadian biodiesel is exported and virtually all is shipped to the United States while only small residual exports head to Europe. Nearly all the biodiesel consumed in Canada is imported from the United States.

In recent years, FAS/Ottawa biodiesel export estimates exceed production, which indicates the possibility that biodiesel is being transshipped. In 2017, the United States applied countervailing duties on Argentine biodiesel which shut down Argentinian exports to the United Staes. Canada began importing Argentine biodiesel in 2018. Volumes are small but persistent since 2018.

In June 2024, Canada began exporting HDRD to California and Texas supported by the U.S. BTC, RIN values, and in the case of California, LCFS credits. Exports of HDRD are forecast to surge to 450 ML as industry takes advantage of the USD \$1/gallon BTC before it expires in mid-December. Industry contacts state that the U.S. [Jones Act](#) makes it cheaper to ship HDRD to California from Braya's Newfoundland HDRD facility than it is to ship it from Louisiana.

Section V. Advanced Biofuels

Sustainable Aviation Fuel: To date, the only commercialized advanced biofuel produced in Canada is renewable diesel (HDRD type). Post is not aware of progress made toward commercial production of SAF; however, several companies including Imperial Oil, Braya, and Tidewater have expressed interest in eventually producing SAF (HEFA-type).

Co-Processed Fuel: Canada also has one coprocessing facility, Parkland, located outside Vancouver, B.C., which has an annual capacity of 146 ML of low carbon gasoline and diesel. Parkland plans to expand co-processing capacity to 350 ML by 2028. Its feedstocks include canola oil and tallow.

Parkland is also partnering with leading Canadian institutions such as the University of B.C. to investigate innovative pathways for co-processing renewable feedstock from non-traditional sources such as municipal sewage sludge, forest and agricultural residue.

Parkland has been exploring options for producing SAF but is limited by the industry jet fuel standard ASTM D1655, which limits the amount of approved renewable feedstocks to 5% in SAF. The company is working alongside other industry experts to increase the limit of approved renewable feedstocks from 5% up to 30% or more.

Section VI. Notes on Statistical Data

Ethanol Fuel Production: Years 2014 to 2021 denatured ethanol fuel production data are derived from data submitted to ECCC by regulated facilities under ECCC's Renewable Fuels Regulation (RFR). Year 2022 data was the final year to be published, because the RFR was fully repealed on September 30, 2024.

FAS/Ottawa's capacity count does not match official Canadian statistics because Statistics Canada recognizes only the ten denatured fuel ethanol facilities, and not the two Greenfield facilities that produce undenatured fuel for the European market.

For year 2022, denatured fuel production is taken from Statistics Canada Table 25-10-0082-01, which is drawn from Statistics Canada's Monthly Renewable Fuel Survey of fuel producers. Because undenatured fuel ethanol is not included in the fuel ethanol category, FAS/Ottawa again adds undenatured fuel exports (HS Code 2207.10.10), and this sum comprises the ethanol fuel production estimate.

Ethanol Fuel Imports: Fuel imports are derived from Statistics Canada Table 25-10-0081-01.

Canada's Biodiesel and Renewable Diesel Import Data: BBD imports are derived from Statistics Canada's Trade Data Online, which publishes import information at the shipment level. Each shipment is assessed to determine if it is biodiesel or renewable diesel based on unit price, volume, and region of origin, because shipments are frequently labelled with incorrect customs codes. FAS/Ottawa consults (S&T) Squared Consultants Inc. on import volumes.

FAS/Ottawa uses customs code 382600 to estimate biodiesel imports, assuming B99 (to maximize the U.S. BTC on 99% of the sale), and removes imports suspected to be HDRD. For example, any shipment under 382600 originating from Singapore or Finland is assumed to be HDRD from NesteOil plants. This occurrence of HDRD being shipped under 382600 is happening less frequently with the introduction of new Canadian HDRD customs codes in 2022, particularly since industry adjusted to using the new codes in the last half of 2023.

Canada began disaggregating its recording of HDRD imports in January 2022 with the newly established HS codes 2710.19.99.23 (diesel fuel blended with HDRD) and 2710.19.99.93 (pure HDRD). FAS/Ottawa assumes that product imported under HS 2710.19.99.23 includes 1% diesel, which is blended into the product to maximize the U.S. BTC on 99% of the sale.

Imports and exports of petroleum oils containing biodiesel up to 30% by volume are internationally harmonized and fall under HS 2710.20. This code is is monitored, but limited volumes traded indicate that biodiesel content under this code remain minimal.

Imports and exports of biodiesel above B30 up to pure B100 are internationally harmonized and fall under HS 382600. This code is tracked with the assumption that all U.S.-Canada trade under this code is B99 to maximize support under the U.S. BTC.

Known biofuel yield rate used in this report:

Biodiesel

Rapeseed oil:	1 MT = 1,136 liters of RME (rapeseed oil methyl ester)
Soyoil, crude:	1 MT = 1,113 liters of SME (soyoil methyl ester)
Soyoil, 1x refined:	1 MT = 1,128 liters of SME (soyoil methyl ester)
Crude palm oil (CPO):	1 MT = 1,087 liters of PME (palm oil methyl ester)
Animal fats/grease:	1 MT = 1,043 liters of AFME (animal fat methyl ester)

HDRD

Plant/animal fats & oils	1MT = 1,053 liters (average)
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Ethanol

Corn kernels: 1 MT = 402 (before 2014) to 417 liters (after 2014)

Wheat kernels: 1 MT = 393 liters

Biodiesel Production: In January 2020, Statistics Canada began publishing bio-based diesel production in Table 25-10-0081-01. In November 2023, the data series began including renewable diesel production. Co-processing was also added to the series, in January 2024. These changes to the production series means that FAS/Ottawa must estimate HDRD and co-processing fuel estimates and subtract them from Statistics Canada’s "renewable fuel except ethanol," to get a biodiesel production total for each year, beginning in 2023.

Years 2013 to 2019 are derived from data submitted to ECCC by regulated facilities pursuant to the requirements of the Renewable Fuels Regulations under the Canadian Environmental Protection Act. The data published is audited and was subject to verifications.

FAS/Ottawa’s 2024 biodiesel production estimates reflect revisions made in 2023 to Statistics Canada data for the period January 2020 through mid-2023.

Table 5: Revisions to Statistics Canada’s biodiesel production estimates (1,000 L)

	Old	New	Difference
2020	405,498	457,810	52,312
2021	415,801	430,742	14,941
2022	357,372	369,192	11,820

Source: FAS/Ottawa, with data from Statistics Canada Table 25-10-0082-01

Renewable Diesel Production: Canadian commercial production of HDRD began November 7, 2023, in B.C. at Tidewater and a second facility, Braya, began operation in Newfoundland in February 2024.

Tidewater in B.C. has been transparent about its forecast to produce 88% of capacity in 2024, on average. FAS/Ottawa adopted this as its B.C. production level forecast because it is currently the only B.C. producer. FAS/Ottawa based its forecast about Braya’s output on publicly available information.

2023 HDRD production data is based on public reports that Tidewater produced approximately 1,500 bbl/d during its nearly eight weeks of operation that year.

Renewable Diesel Exports: USDOE’s Energy Information Administration (EIA) publishes a monthly industry survey known as “Company Level Imports,” which is found at

<http://www.eia.gov/petroleum/imports/companylevel/>. Product Code 205 is used to pull data specifically covering and only covering renewable diesel. This U.S. HDRD import data identifies shipments of product from Canada and is used to track all Canadian HDRD exports. So far, Canadian HDRD exports are shipped only to U.S. destinations and nowhere else.

Fuel Pool: FAS/Ottawa uses fuel pool (June 2024) estimates from International Energy Agency (IEA), which receives its data from Natural Resources Canada. Due to revisions to IEA data which lowered the diesel fuel pool estimates in each of the years since 2015 with the exception of 2022 and 2023 (which were revised up), national average blend rate estimates reported by FAS/Ottawa were revised slightly from last year.

Attachments:

No Attachments