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Report Highlights:

Canada's Clean Fuel Regulation (CFR), Quebec's new low-carbon fuel regulation, and E15 in Ontario (in 2030) are expected to drive up ethanol demand in Canada. The CFR became law on July 6, 2022 and is designed to reduce greenhouse gas (GHG) emissions associated with transportation fuel. In 2021, Canadian imports of U.S. fuel ethanol increased eight percent, year-over-year, to 1.3 billion liters. This increase was driven by higher Canadian fuel usage and an increased share of domestic supply going to exports. In 2022, imports of U.S. fuel ethanol are forecast at a record 1.5 billion liters with further expansion of the fuel pool and an upward trend in the average nationwide blend level.

Executive Summary

In July 2022, the Government of Canada published the final [Clean Fuel Regulation](#) (CFR) in Canada Gazette Part II. The regulation is designed to reduce the carbon intensity of liquid fuels and improve air quality by encouraging increased usage of renewable transportation fuels.

The final text of the CFR contains several revisions of the December 2020 version that will benefit renewable fuel industries and includes the addition of text that enables equal treatment of imports. The 2020 [draft of the CFR](#) contained text that disadvantaged imports of foreign biofuels into Canada, such as wording in Section 28(1) which limits compliance credits created from Bio-Energy Carbon Capture Utilization and Storage (BECCUS) to Canadian-origin BECCUS projects. The final regulation allows credit creation for foreign BECCUS projects.

The U.S. government, like all foreign governments, must apply for legislative recognition (LR) from the Canadian government to affirm that U.S. imports comply with Canada's Land Use and Biodiversity (LUB) criteria. There is nothing in the text of the CFR that guarantees U.S. industry's participation in Canada's credit creation program.

The draft CFR's contributions to GHG emission reduction were initially anticipated to be 30 million tons annually by 2030. Several changes have been made to the draft regulation with revisions being made as recently as April 2022. ECCC has not announced a re-estimate of CFR's contribution to GHG emission reductions.

The intent of Canada's CFR is to extend progress achieved in reducing GHG emissions. It is a market-based system, as opposed to a command-and control system that sets production or consumption mandates for specific fuel classes. As a market-based system, it sets a level playing field for all fuels, fossil and bio-based alike, and places the onus on fuel suppliers to determine which fuels to supply while requiring the entire transport fuel market to meet certain GHG emission targets. The choice of which biofuel to use is independent of feedstock choice, but over time lower carbon intensity (CI) fossil and bio-based fuels will be advantaged while those with higher CI scores will be disadvantaged in the market. CI requirements are not expected to be revised if domestic feedstock supply is insufficient to meet GHG emission targets, which would support increased biofuels and biofuel feedstock trade.

The CFR is expected to increase demand of imported U.S. feedstocks, in particular vegetable oil feedstocks, such as canola oil and soy oil. U.S. canola oil exports may find a growing market in Canada, particularly since the U.S. Environmental Protection Agency (EPA) recently approved Renewable Fuel Standard (RFS) pathways for certain biofuels that are produced from canola oil.

Feedstocks currently used in Canada for renewable fuel production include canola oil, soybean oil, camelina oil, corn, and wheat. Unlike in the United States, very little domestic yellow grease and tallow is used as feedstocks, because supplies are relatively smaller and tied to population levels.

In 2021, Canadian imports of fuel ethanol increased eight percent, year-over-year, to 1.3 billion liters. In 2022, imports of U.S. fuel ethanol are forecast at a record 1.5 billion liters with further expansion of the fuel pool and an upward trend in the average nationwide blend level. The 2021 increase was driven by increased Canadian fuel usage, as government-imposed pandemic-related travel restrictions began to lift, and because relatively low-priced U.S. fuel ethanol imports are backfilling Canada's higher-priced undenatured fuel and non-fuel ethanol exports to Europe. In 2022, strong demand for U.S. ethanol is expected to continue, assuming U.S. ethanol remains competitive and continues to backfill elevated Canadian exports, and reduced COVID-19 pandemic restrictions support Canadians traveling.

Canadian exports of fuel ethanol have been on the rise in recent years, reaching record levels in 2020 and increasing further to about 100 million liters in 2021 and 2022. Reporting on 2022 market conditions in Europe, FAS's ethanol analyst based in the Netherlands reports that sharply higher fuel ethanol prices and somewhat stronger demand for ethanol is due to even higher gasoline prices and increasing sales of E10 and E85 have fueled increased demand for North American ethanol. It is possible some Canadian product being shipped under the harmonized system (HS) code for undenatured fuel ethanol is, in fact, used for non-fuel purposes such as hand sanitizer.

In late 2021 and 2022, Quebec and British Columbia announced provincial regulations and intentions aimed to increase the renewable fuel content required in regular gasoline and diesel. Quebec's new standard requires ten percent renewable content in regular grade gasoline in January 2023, 12 percent in January 2025, 14 percent in January 2028, and 15 percent in January 2030. It also requires three percent renewable content in diesel from January 2023, five percent from January 2025, ten percent from January 2030.

In June 2022, British Columbia began consulting on whether it will introduce blending obligations for sustainable aviation fuel (SAF). If introduced, it would make the province the first market in North America to require SAF blends.

ACRONYMS

AF alternative fuels

ATJ alcohol-to-jet

BBD Biomass-Based Diesel

BC-LCFS British Columbia's low carbon fuel standard

BECCUS Bio-Energy Carbon Capture Utilization and Storage

Btu British thermal unit(s)

CAAFI Commercial Aviation Alternative Fuels Initiative

CG Canada Gazette

CO_{2e} Carbon dioxide equivalent

CC Compliance Category

CCS Carbon Capture and Sequestration

CCUS Carbon Capture, Utilization, and Storage

CFR Clean Fuel Regulation

CFS Clean Fuel Standard

CI Carbon Intensity

ECCC Environment and Climate Change Canada

IEA International Energy Association

FT Fischer-Tropsch

GHG greenhouse gas

HEFA hydro-processed esters and fatty acids

HS harmonized system

HTL hydrothermal liquefaction

ICAO International Civil Aviation Organization

J Joule

LCA life-cycle assessment

LR Legislative Recognition

LUB Land Use and Biodiversity

MFSP minimum fuel selling price

MLPY million liters per year

MSW municipal solid waste

Mt megatons

OBPS Output-Based Pricing System

QM quantification methodology

R&D research and development

RD Renewable Diesel

RDF Refuse derived fuel

RFR Renewable Fuel Regulation

RFS Renewable Fuel Standard

SAF sustainable aviation fuel

SPK synthetic paraffinic kerosene

toe tons of equivalent

UNFCCC United Nations Framework Convention on Climate Change

USDA U.S. Department of Agriculture

Wh Watt hour

ZEV zero emissions vehicles

II. Policy and Programs

Renewable Energy and Greenhouse Gas (GHG) Emissions

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. Further, [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. This followed President Biden’s Leaders’ Summit on Climate, where the United States and Canada announced a new initiative engaging governments around the world to increase the use of renewables and lower dependence on fossil fuels in government operations. Leading by example, both countries also announced they will work together in their respective efforts towards the shared goal of net-zero emissions government.

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 July 2022, the Government of Canada published the final [Clean Fuel Regulation](#) (CFR) in Canada Gazette Part II, following the publication of a [draft regulation](#) in December 2020 in Canada Gazette Part I. By reducing the lifecycle carbon intensity (CI) of liquid fuels and all energy used in Canada, the CFR aims to stimulate investments and innovation in low-CI fuels and decouple GDP from emissions. The CFR requires gasoline and diesel primary suppliers (i.e. producers and importers) to reduce the CI of the 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

Carbon Intensity Limit for Each Compliance Period (gCO ₂ e/MJ)								
Liquid Fossil Fuel	2023	2024	2025	2026	2027	2028	2029	2030 and after
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, Clean Fuel Regulation

The scope of the Regulations has been narrowed to cover only liquid and gaseous fossil fuels. This is a departure in the design of the regulations from their initial scope in 2016, when it was proposed that the new measure would cover liquid, gaseous, and solid fuels. To meet their obligation, primary suppliers are required to use credits to satisfy their annual reduction requirement. There is no limit to the number of liquid compliance credits that may be used by a primary supplier for the purposes of compliance. A primary supplier may use gaseous compliance credits in order to satisfy up to ten percent of its total. There are no longer credit creation opportunities for solid fuel.

A ECCC [news release](#) published June 29, 2022, after several revisions were made to the regulation, states, “the CFR will help cut up to 26.6 million tons of greenhouse gas pollution in 2030.” This is a departure from the text of the draft CFR which states that the regulation has the potential to achieve 30 million tons of annual reductions in GHG emissions by 2030. “The May 2022 government document “[2030 emissions reduction plan: Canada's next steps to clean air and a strong economy](#),” provides more details of Canada’s plan, but nary mentions the CFR’s contribution to overall GHG emissions reductions.

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 that seeks to “enable global partnerships and solutions at the intersection of agriculture and climate change. The initiative was launched at COP26.

In British Columbia, The Greenhouse Gas Reduction Act and the Renewable & Low Carbon Fuel Requirements Regulation, known collectively as British Columbia’s low carbon fuel standard (BC-LCFS), is to date the single most effective GHG emissions reduction contributor for transportation fuels in Canada. A provincial government news release states that the BC-LCFS is expected to lead to five million tons of GHG emissions reductions by 2030, accounting for 31 percent of the total emissions reductions required to meet [CleanBC](#) climate targets.

As reported by the [Canada Energy Regulator](#), Canada’s GHG emissions in 2019 were 730.2 megatons (MT) of carbon dioxide equivalent (CO₂e). Canada’s emissions have declined 8.4 percent since 2005.¹ The largest sector for GHG emissions in Canada is oil and gas production, which emitted 191.4 MT CO₂e in 2019. Transportation was the second largest emitter with 185.8 MT CO₂e, followed by industries and manufacturing at 101.0 MT, and buildings at 90.7 MT.

¹ <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-canada.html>

Federal Biofuel Policy and Financial Supports and Provincial Mandates and Programs

Federal Policy and Financial Supports

The Government of Canada aims to meet its GHG emission reduction goals primarily through the adoption of two programs. Of importance to renewable fuels, the CFR aims to reduce the lifecycle CI of fuels and energy used in Canada, while the Greenhouse Gas Pollution Pricing Act (GGPPA) puts a tax on the carbon content of fossil fuels and establishes a credit trading system for large emitters, known as the Output-Based Pricing System (OBPS).²

The CFR requires that gasoline and diesel primary suppliers (producers and importers) reduce the CI of the gasoline and diesel they supply the market from 2016 CI levels by 3.5 gCO₂e/MJ in 2023, increasing at an annual rate of 1.5 gCO₂e/MJ to 14 gCO₂e/MJ in 2030 (up from 12 gCO₂e/MJ in prior iterations) if they wish to participate in the credit market. The annual CI reduction requirements that primary suppliers must meet for the gasoline and diesel fuels they supply is the difference between a baseline CI value and a CI limit for gasoline and diesel combined. SAF is eligible for credit creation but is not an obligated fuel.

The scope of the final CFR has been narrowed to gasoline and diesel, liquid fossil fuels used predominately in transportation. The reduction requirements for heavy oil, light oil and kerosene were removed. An exclusion was added for fuel used in space heating.

The CFR replaces the Federal Renewable Fuels Regulations (RFR), established in August 2010. The RFR requires petroleum fuel producers and importers to have an average minimum renewable content of five percent based on their volume of gasoline, and an average minimum renewable content of two percent based on their volume of diesel fuel and heating distillate oil. The RFR will be repealed in September 2024, but the current minimum renewable content found in the RFR is written into the CFR.

The long-awaited CFR faced several delays since it was first announced in 2016, due to industry concerns, federal elections (October 2019 and September 2021), and staffing resource challenges. In early 2017, the Government of Canada began working with provincial, territorial, and industry stakeholders on the development of the CFR. Original plans set in November 2017 called for the draft CFR to be published in Canada Gazette Part I in 2018 and the final CFR to be published in Canada Gazette Part II in 2019, when it would become law. However, in 2018, ECCC announced that the CFR would not be finalized in 2021. A series of additional setbacks followed, and the Canadian government announced the CFR would be finalized in “spring 2022.”

In response to the draft CFR, U.S. industry raised concerns about credit creation from carbon capture, utilization and storage (CCUS); land use and biodiversity (LUB) criteria; recognition of

² Since 2019, every province and territory in Canada has had a price on carbon and a credit trading system. Those that did not develop their own, were required to use the federal “backstop.”

U.S. laws that meet the LUB criteria (ie. aggregate compliance); and the absence of details related to the Fuel Lifecycle Analysis (LCA) tool.

BECCUS

The draft CFR, as it was written in Gazette 1, Section 28(1), stated that biofuel producers who utilize BECCUS/CCS could only create compliance credits if the BECCUS/CCS activities occurred in Canada. The Canadian origin requirement was removed in the final regulation.

LUB Criteria – Aggregate Compliance

ECCC has yet to declare if U.S. state-level or federal-level regulations related to protected areas, ecosystems at risk, and the transfer of damaging agents (ie. pests), will be recognized by the CFR, creating uncertainty for U.S. industry. Industry states that this hinders their ability to plan ahead. ECCC states that use of the LR for aggregate compliance requires an application to ECCC from a national or subnational entity, or credible authority (defined as another level of government). ECCC has stated that application guidance will be available only after the CFR is published.

The requirement for LR will enter into force Jan. 1, 2024, for all feedstocks grown as of Jan 1, 2024. This does not cover biofuel made in February 2024 if the feedstock was grown in 2023; however, it may still be exported to Canada, but it will not create credits.

If no application for LR is in place by Jan 1, 2024, trade can continue. However, for the exporter to create credits under the CFR, it must use evidence of compliance with those legal mandates as evidence of achieving an intended outcome. This could be in the form of a declaration from the grower, as well as providing other proofs, for example, maps of protected areas juxtaposed over the map of the farm.

CFR Timeline and Important Dates:

- **June 20, 2022:** The final CFR was approved by Cabinet and early credit creation may begin; surplus compliance units under the RFR can be converted into credits under the CFR.
- **June 22, 2022:** The formal publication of the [LCA tool](#);
- **July 6, 2022:** The final CFR is published in CG Part II, and subsequently become law. Because Part CG Part III does not contain regulations, it does not pertain to the CFR. The CFR falls under the Canadian Environmental Protection Act (CEPA) which is already effective and published in Part III.
- **July 6, 2022:** Certain components of the regulations come into force, including registration, applications; ECCC will publish supplemental specifications for other fuel pathways (such as RD).
- **July 6, 2022:** Federal and state-level governments can now apply to have their respective regulations recognized by the CFR in order to be granted full aggregate compliance under the LUB criteria.
- **Calendar year 2022:** Last compliance period for RFR
- **July 1, 2023:** initial CI reduction requirement comes into force
- **January 1, 2024:** LUB requirements (including all declarations), and the requirement for legislative recognition (LR) will come into force.
- **2024:** A new version of the Fuel LCA Model will be published.
- **September 30, 2024:** RFR will be repealed.

If a producer does not have LR for their feedstocks by Jan 2024, they will be required to meet LUB through other means, documented practices in line with LUB, certification schemes or programs, etc. If the feedstock is produced somewhere that LR could be attained, then showing compliance with those state / national legal mandates that meet the LUB objectives would be possible. There is no requirement for LR of a company exporting LCIF to Canada. It is an added flexibility for producers in those regions where robust environmental practices meeting LUB are already in place due to existing state or national legal requirements.

However, the producer could be vulnerable to varying legal interpretations and could be negatively impacted if the legal requirement they are citing is not recognized as achieving the same outcome.

LUB Criteria – Aggregate Compliance in Canada

On May 6, ECCC announced that many of the LUB criteria can now be met by Canadian national laws, meaning that compliance no longer depends on laws that are present in only some provinces and territories and not others. U.S. industry viewed this as a positive announcement, with the assumption being that U.S. federal-level laws may also meet LUB criteria, as opposed to multiple sub-national (provinces or state) governments applying for aggregate compliance with varying outcomes.

Specifically, ECCC announced:

- The intended outcome of the wildlife habitat criterion is achieved by Canada’s federal **Species at Risk Act**; therefore, this act can be used to provide Canada-wide compliance for both agricultural and forest feedstock.
- The intended outcome of the damaging agents criterion is achieved by the federal **Plant Protection Act**; therefore, this act can be used to provide Canada-wide compliance for both agricultural and forest feedstock.
- The intended outcome of the forest watercourse connectivity criterion is achieved by the federal **Fisheries Act**; therefore, this act can be used to provide Canada-wide compliance for forest feedstock.
- All other criteria eligible for LR (forest regeneration; naturally regenerated forest protection; forest soil, water, and biodiversity protection) must be met through provincial/territorial legislation approved via LR, certification under an approved CFR-certification scheme, or on-site documentation retention.

LUB Criteria – Certification and Verification

The LUB criteria, as they were written in the draft CFR, outlined certification and verification requirements³ that agricultural producers perceived to be burdensome. Since the publication of the draft CFR, ECCC announced several intended changes to the LUB criteria that are expected to be included in the final CFR in Canada Gazette Part II. Agriculture stakeholders tell FAS/Ottawa that these revisions lessen the burdens associated with industry certification and verification, including site visits.

LUB Criteria – Protecting Ecosystems

On May 5, 2022, ECCC announced that the CFR will not require the protection of “vulnerable ecosystems,” because protection of these areas is largely covered by other LUB criteria. The criterion prohibits feedstock cultivation and harvest in the habitat of any rare, vulnerable, or threatened species.

A second additional change, announced May 5, 2022, is that the CFR will not require forest management plans to promote natural regeneration of harvested areas or replanting within four

³ The draft CFR, as it was written in Gazette I, provides what can be characterized as a ‘partial aggregate compliance’ approach to satisfying aspects of the LUB criteria, clearly providing an option for jurisdictions with no significant crop land expansion to demonstrate compliance with section 38 on an aggregate basis pursuant to s39 or s40.

It also provides separate options for other LUB criteria: protected areas (s35.1 in the CFS), harvest (s.36.a), and damaging agents (s.36.b) to be met on an aggregate basis through the recognition of legislation pursuant s.42 and s.43

years of the harvest date. Instead, “forest management plans must promote timely regeneration to the pre-harvesting condition.”

Protection of rare or sensitive ecosystems will continue to be achieved through other aspects of the LUB criteria such as:

- Protection of rare, vulnerable, or threatened species;
- Harvest prohibition on excluded lands (most vulnerable ecosystems fit the definition of excluded lands); and,
- Implementation of forest management plans (requires protection of biodiversity, water and soil quality and quantity, as well as watercourse connectivity).

Fuel LCA Tool and Feedstock CI Values

The Fuel CI tool determines CI values based on ‘default’ data within the tool. Fuel suppliers have an option to enter their own data and apply to the Minister for the approval of a CI determined.

The Fuel LCA tool was published (and a second [revised version](#) was released in July 2022). However, several factors within the model were aggregated, making it challenging to review.

For example, the LCA tool tracks three sources of soil organic carbon (SOC) to calculate the carbon intensity of biofuel feedstocks. They are:

- Low till/ no till
- Decreased summer fallow
- Perennial to annual cropping changes

The LCA tool aggregates these sources, so the weight attributed to each is unknown. This, and other similar aggregation, made it difficult to ascertain how, for example, canola grown in Canada had a lower carbon intensity score than soybeans grown in the United States, in the December 2021 version of the model. Or why corn grown in the United States had a lower carbon intensity score than corn grown in Ontario, also in the 2021 version.

Because the December 2021 fuel LCA model computed a higher carbon intensity score for Ontario corn than it did for U.S.-grown corn, it essentially made Ontario corn less competitive than U.S. corn. Ontario corn growers lobbied the Canadian government to revise the fuel LCA tool to at least make Ontario corn competitive with U.S. corn, saying such a revision was integral to their buy-in of the CFR.

However, the Canadian canola industry was concerned about any possible revisions to the published version of the LCA tool, not wanting to lose the large advantage Canadian canola had over U.S. soybeans.

ECCC stated that differences in CI scores between Canadian corn and U.S. corn can be explained by differences in the data used in relation to time scales and types of land management issues captured by the data. ECCC states that these issues will be resolved in the 2024 version of the LCA model. The challenges, it explained, were too complex to resolve before the publication of the final CFR in July 2022. Therefore, a temporary fix is in effect. On May 5, 2022, ECCC announced they will be implementing the following changes:

1) Replace the regional crops' CI values (provincial, state, and national levels) with a single CI value for each crop (see Table 1), regardless of geographic boundaries, and a single value for all vegetable oils, regardless of geography.

2) Remove the SOC emissions associated with changes in the proportion of annual and perennial crops. The SOC emissions associated with changes in tillage practices and summer fallow will continue to be included in the scope of crop CI values and are based on the provincial values from the 2017 Canadian Roundtable for Sustainable Crops (CRSC) reports.

The result of these revisions is that U.S. corn no longer has an advantage over Canadian corn. Also, Canadian canola oil no longer has an advantage over U.S. soy oil.

Table 2: Preliminary Revised Crop CI Values Covered by the Fuel LCA Model

Crop³	Preliminary revised CI⁴ (g CO₂e/dry kg)
Barley	183
Corn	326
Field peas	79
Sorghum	431
Wheat (durum)	72
Wheat (non-durum)	223

Source: ECCC

Table 3: Preliminary Revised Crop CI Values Covered by the Fuel LCA Model

	Preliminary CI⁴ (g CO₂e/kg)
Vegetable oil from oilseed	482

Note: “Vegetable oil” can include, but is not limited to, soybean oil, canola, oil, camelina oil, flaxseed oil. The CFR states that eligible feedstocks are feedstocks that are produced in a manner that does not create a high risk of an indirect change to land use that adversely affects the environment. To date, only palm oil has been identified as being a high-risk feedstock, and as such will be an ineligible to create credits under the CFR. If the feedstock is not indicated in the above tables, fuel suppliers can apply to the Minister with a new pathway created within the Fuel LCA tool.

This is a temporary fix until ECCC can transition to a permanent solution. A new version of the Fuel LCA Model will be published for the regulations in 2024. If the new CI is lower than the previous CI, a one-time credit adjustment will be provided for the associated volume of low-CI fuels supplied since the registration of the credit creator in the reporting system.

Biofuel and Biofuel Feedstock Environmental Sustainability and Certification

U.S. producers of feedstocks and biofuels must register with the Minister of Environment to participate in the CFR. ECCC plans to make the registration portal available shortly after the CFR is published.

A primary supplier that is not already registered must register by submitting to the Minister a registration report that contains the information set out in items 1 to 3 of Schedule 3 of the CFR no later than 90 days after they produce in Canada or import, during a given compliance period, a total volume of 400 m³ or more of any type of fuel in the liquid class, according to the final

text of the CFR. This replaces text of the CFS that required a report be submitted within only ten days after a primary supply produces in Canada or imports any type of liquid fuel.

In the case of feedstock certification, a feedstock is eligible for use under the CFR, after harvesters, within their declarations, confirm that the feedstock meets the requirements of each LUB criterion, or state that their operation is obligated under a piece of legislation recognized by the CFR under the LR process. If a piece of federal legislation is accepted via LR for a given LUB criterion, the harvester will simply include a clause in their declaration that states that they are obligated under this piece of legislation. All other information required within the declaration has been streamlined and most, if not all, are found in standard contracts (e.g., information on the buyer/seller, feedstock type, feedstock amounts, etc.). Therefore, these confirmation clauses that are specific to LUB compliance can be added to pre-existing contracts.

If a harvester claims to be obligated under a piece of legislation recognized by the CFR via LR, all a certifier will examine is that the harvester is obligated under this piece of legislation. The actions that the harvester takes to comply with this legislation will not be verified by CFR certifiers.

If no application for legislative (national or sub-national) recognition is in place, the feedstock suppliers must use evidence of compliance with legal mandates as evidence of meeting the LUB Criteria, in order to create compliance credits. Retroactive credits will not be created beyond ten days of the action taking place.

Public Perception

The federal government faces growing pressure from consumers and industry groups to postpone climate resilience objectives and greenhouse gas (GHG) emission reduction strategies due to high fuel costs. However, the implementation of the Clean Fuel Regulation is on track, and the federal government shows no interest in pausing incremental increases to the carbon tax on fuel, unlike some provincial governments (eg. Alberta and Ontario, which both introduced temporary relief of fuel taxes).

Food price inflation and new climate change policies that encourage the use of crop-dependent biofuels have rekindled the food vs fuel debate amongst Canadian consumers. FAS/Ottawa is monitoring this development.

Financial Supports for Biofuel Producers

Bill C-19, an Act to Implement certain Provisions of the Budget tabled in Parliament Budget implementation, states that income tax will be halved (from 15 to 7.5 percent) on 30 percent of operating income for qualified activities conducted by renewable fuel producers. The Canadian government approved the budget and details on the tax relief are forthcoming.

Bill C-19 does not define “qualified activities,” but describes those activities as:

- (b) qualified activities that are performed in connection with production in Canada of
 - o (i) hydrogen by electrolysis of water,
 - o (ii) gaseous biofuel (as defined in subsection 1104(13)),
 - o (iii) liquid biofuel (as defined in subsection 1104(13)), and
 - o (iv) solid biofuel (as defined in subsection 1104(13)).

In 2018, Canada launched two challenges under [The Sky's the Limit Challenge](#). These challenges expanded the SAF network in Canada and contributed to cross-sectoral consortia building, helping industry identify existing expertise and capacities to help further scale up SAF in Canada.

In March 2022, it was [announced](#) that Enerkem, based in Montreal, was awarded the CDN \$5-million grand prize. Enerkem develops and uses advanced biochemical processes to convert municipal solid waste, as well as forestry and agricultural biomass, into sustainable chemicals and advanced biofuels, including sustainable aviation fuel.

See FAS Ottawa's [2021 Biofuels Annual Report](#) for information on previously announced federal and provincial financial support programs.

Provincial Policies and Programs

Provincial-level regulatory announcements occurring since the last FAS Ottawa [annual biofuels report](#) was published in January 2022 are described below.

British Columbia:

British Columbia's new [LCFS \(Low Carbon Fuel Standard\)](#) became effective on June 2, 2022.

Also in June, British Columbia began consulting on whether it will introduce blending obligations for SAF. Industry contacts say the province is very likely to become the first market in North America to obligate.

In April 2021, the province's carbon tax rate rose from \$40 CDN to \$45 CDN/tCO₂e. The rate is scheduled to increase to \$50 CDN/ tCO₂e on April 1, 2022. It has also committed to exceed the federal carbon tax rate, which is scheduled to rise to \$170 CDN by 2030.

Under British Columbia's [Greenhouse Gas Reduction \(Renewable and Low Carbon Fuel Requirements\) Act](#), Part 3 fuel suppliers may purchase validated credits in order to achieve

compliance with the low carbon fuel requirements. [Credit market activity](#) is published on the provincial government's web site. Credit transfers reached a record maximum price of CDN \$519 per credit in calendar year 2021, up from the previous maximum of \$385.20 in calendar year 2020.

Québec (Canada's second largest gasoline market, largest diesel market):

Quebec's [new standard](#) requires ten percent renewable content in regular grade gasoline in January 2023, 12 percent in January 2025, 14 percent in January 2028, and 15 percent in January 2030. Quebec does not currently have a provincial blending requirement.

Renewable content must have an average CI of 45.7g CO₂e/MJ, until 2028 when this decreases to 41.1g.

Quebec's new standard also requires three percent renewable content in diesel from January 2023, five percent from January 2025, ten percent from January 2030.

The regulation reportedly provides for a delayed implementation in the Quebec City corridor, where the regulation will come into force in January 2025.

Like in Ontario, obligated parties can comply with less renewable volume if the CI of the fuel is lower than the target; or they can comply with a higher CI renewable fuel if they exceed the volume percentage.

Compliance credits will be generated on a per-liter basis. One credit corresponds to one liter of low-CI fuel content.

The CI to be calculated using GHGenius 4.03c.

Ontario:

Ontario maintains a renewable content requirement of ten percent for regular-grade gasoline. In November 2020, Ontario announced its decision to increase the amount from 10 to 15 per cent by 2030.

Import Policy Including Duties/Export Taxes and Levies

Canada collects a CDN \$0.0492 per liter tariff on denatured ethanol imported from most favored nation (MFN) status countries under the 2207.20 HS line, including Brazilian denatured ethanol. Products imported under 2207.20 from the United States, the European Union and other free trade agreement partners enter Canada duty free. Undenatured ethanol imported under 2207.10 from all sources enter Canada duty-free.

In the fall of 2021, Canada launched consultations on the development of a Border Carbon Adjustment (BCA). In December 2021, Prime Minister Justin Trudeau [mandated](#) the finance minister “Consider applying Border Carbon Adjustments to emissions-intensive imports, such as steel, cement and aluminum.” The BCA would work by charging goods at the border a carbon price equivalent to what they would have paid had they been produced under Canada’s domestic carbon pricing regime. While some countries are considering including carbon-emitting transportation fuels in their BCA approach, Canada has yet to announce whether this is a consideration.

Section III. Ethanol

Table 4: Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021e	2022f
Beginning Stocks	130	131	131	131	131	131	131	131	-	-
Fuel Begin Stocks	130	131	131	131	131	131	131	169	173	141
Production	1,815	1,820	1,820	1,860	1,890	1,990	-	-	-	-
Fuel Production	1,717	1,756	1,721	1,739	1,728	1,748	1,891	1,698	1,750	1,800
Imports	1,080	1,161	1,224	1,192	1,251	1,346	1,274	1,256	1,373	1,600
Fuel Imports	1,079	1,139	1,088	1,113	1,216	1,233	1,220	1,164	1,254	1,480
Exports	58	63	68	76	88	73	83	143	178	180
Fuel Exports	0	0	0	0	0	0	9	75	108	100
Consumption	2,836	2,918	2,976	2,976	3,053	3,263	-	-	-	-
Fuel Consumption	2,795	2,895	2,809	2,852	2,944	2,981	3,064	2,783	2,928	3,180
Ending Stocks	131	131	131	131	131	131	131	236	-	-
Fuel Ending Stocks	131	131	131	131	131	131	169	173	141	141
Refineries Producing Fuel Ethanol (Million Liters)										
Number of Refineries	15	15	15	14	13	12	12	12	12	12
Nameplate Capacity	1,760	1,800	1,800	1,750	1,653	1,822	1,841	1,881	1,881	1,881
Capacity Use (%)	97.6%	97.6%	95.6%	99.4%	104.5%	95.9%	102.7%	90.3%	93.0%	95.7%
Co-product Production (1,000 MT)										
DDGs	1,326	1,334	1,306	1,317	1,311	1,332	1,428	1,259	1,296	1,333
Corn Oil	6	6	6	10	10	10	-	-	-	-
Feedstock Use for Fuel Ethanol (1,000 MT)										
Corn	2,172	3,371	3,405	3,577	3,411	3,884	4,102	3,352	3,550	3,700
Wheat and other grains 1/	2,063	891	766	630	778	370	459	552	540	560
Market Penetration (Million Liters)										
Fuel Ethanol Use	2,795	2,895	2,809	2,852	2,944	2,981	3,064	2,783	2,928	3,180
Gasoline Pool 1/	47,412	46,688	47,620	49,149	49,605	51,085	51,334	45,051	46,554	47,490
Blend Rate (%)	5.9%	6.2%	5.9%	5.8%	5.9%	5.8%	6.0%	6.2%	6.3%	6.7%

Note: 1/ Covers gasoline and all biocomponents (biofuels) like ethanol and ETBE as well as MTBE if used; Data source: IEA; See Section VI. notes on statistical data for feedstock-to-biofuel conversion rates. e=estimate; f=forecast

Ethanol Production

In 2022, fuel ethanol production is forecast to increase by three percent year-over-year on a larger domestic fuel pool, and an upward tick in national average blend and foreign demand. Year-to-date (January to April 2022) production is up ten percent from the previous year.

In 2020, a facility in Quebec began producing undenatured fuel ethanol for export to the Netherlands, France. Facilities in Ontario and Quebec also began producing more non-fuel undenatured ethanol for pandemic related purposes.

Fuel Ethanol Exports

Canadian exports of fuel ethanol have risen, reaching record levels in 2020 and increasing further to about 100 million liters in 2021 and 2022. Fuel ethanol prices in Europe have trended strongly upwards with prices spiking even higher since mid-2021. Not only is North American ethanol generally more price competitive (despite high EU MFN duties) in Europe, but European demand for fuel ethanol has strengthened in 2022 as ethanol has become cheaper compared to gasoline, leading to higher blends in select markets, especially in France where E10 and E85 use has risen.

Exports of undenatured fuel ethanol in 2021 made up six percent of total fuel ethanol production, up from a negligible share of fuel ethanol production in 2019 and earlier.

Table 5: Estimating the Growth of Undenatured Ethanol Fuel in Canada

Year	Exports of Undenatured Fuel Ethanol, '000 Liters	Total Ethanol Fuel Production, '000 Liters	Undenatured Fuel Ethanol Exports as a Share of Total Ethanol Fuel Production
2015	12	1,721,000	0%
2016	1,075	1,739,000	0%
2017	48	1,728,000	0%
2018	24	1,748,000	0%
2019	3,050	1,891,000	0%
2020	75,040	1,698,268	4%
2021	107,690	1,736,816	6%

Sources: Created by FAS/Ottawa using data from Canada's CIMT database (HS Code 2207.10.10); Statistics Canada Table 25-10-0082-01

Fuel Ethanol Imports

In 2021, Canadian imports of U.S. fuel ethanol increased eight percent year-over-year to a record level of 1.3 billion liters because of increased Canadian fuel usage and because U.S. fuel ethanol imports are backfilling Canada's new export market. A relaxation of pandemic-related government-imposed restrictions means transportation usage increased.

The volume of fuel ethanol imports is forecast to increase nearly 20 percent in 2022, based on strong domestic demand to date and the continued price competitiveness of U.S. suppliers. The volume of fuel ethanol imports YTD April 2022 are up 50 percent over the previous year on increased domestic consumption. Total ethanol imports, including fuel are up 47 percent YTD.

Section IV. Biodiesel or Biodiesel/ Renewable Diesel

Table 6: Biodiesel (FAME) & Renewable Diesel (HDRD), Million Liters										
Calendar Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022f
Biodiesel (Million Liters)										
Beginning Stocks	4	20	20	20	20	20	20	11	10	10
Production	159	351	397	464	397	308	359	457	416	400
Imports	301	264	281	262	300	391	409	384	380	360
Exports	156	327	267	455	350	308	342	451	440	375
Consumption	289	287	410	270	348	391	436	391	356	385
Ending Stocks	20	20	20	20	20	20	11	10	10	10
Renewable Diesel (Million Liters)										
Production	0	0	0	0	0	0	0	0	0	0
Imports	289	346	224	261	411	358	380	500	480	500
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	289	346	224	261	411	358	380	500	480	500
Biodiesel + Renewable Diesel (Million Liters)										
Beginning Stocks	4	20	20	20	20	20	20	11	10	10
Production	159	351	397	464	397	308	359	457	416	400
Imports	590	610	505	523	711	749	789	884	860	860
Exports	156	327	267	455	350	308	342	451	440	375
Consumption	577	633	634	531	759	749	816	891	836	885
Ending Stocks	20	20	20	20	20	20	11	10	10	10
Biodiesel Production Capacity (Million Liters)										
Number of Plants	8	8	9	9	9	11	13	12	12	12
Nameplate Capacity	400	400	400	550	591	728	931	912	912	912
Capacity Use (%)	40%	88%	99%	84%	67%	42%	39%	50%	46%	44%
Renewable Diesel Production Capacity (Million Liters)										
Number of Plants	0	0	0	0	0	0	0	0	0	0
Nameplate Capacity	0	0	0	0	0	0	0	0	0	0
Capacity Use (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Feedstock Use for Biodiesel + Renewable Diesel (1,000 MT)										
Canola Oil	35	152	220	224	250	175	230	265	-	-
Soybean Oil	1	0	0	15	20	5	10	21	-	-
Used Cooking Oil	65	84	143	50	70	20	-	-	-	-
Animal Fats	30	36	37	55	81	82	68	67	-	-
Market Penetration, Biodiesel + Renewable Diesel (Million Liters)										
Diesel Pool, total 1/	34,530	34,279	34,998	32,702	35,387	36,363	37,390	35,535	35,637	36,001
Blend Rate (%)	1.7%	1.8%	1.8%	1.6%	2.1%	2.1%	2.2%	2.5%	2.3%	2.5%

Note 1/ Fossil diesel plus all "bio-components" (biofuels) blended with fossil diesel; data source: IEA
HDRD (Hydrogenation-derived Renewable Diesel) dominates commercialized renewable diesel worldwide.

f = forecast
e = estimate

Biodiesel Production

Statistics Canada's monthly survey-based biodiesel production estimate shows 2021 production down nine percent from 2020 levels. However, reported production levels for 2021 are only an estimate, and this survey has in the past under-reported biodiesel production. It under-reported biodiesel production by 11 percent in 2020, evidenced by audited data collected under the Renewable Fuels Regulations by ECCC. ECCC data is not yet available for 2021.

Year 2022 production levels are forecast to be similar to 2021, based on year-to-date production estimates drawn from Statistics Canada's survey data.

Innoltek Inc. is planning to increase capacity at its biodiesel plant in Saint-Jean-sur-Richelieu, Quebec by more than 60 percent. The facility will reportedly produce about 22.7 million liters per year by late 2023, up from the current 13.6 million liters. The company uses rendered animal fats as a feedstock. Innoltek, like other biodiesel companies in its region, will benefit from mandated blending requirements in Quebec that take effect in 2023, and New York's B5 'bioheat' statewide mandate for heating oil by summer 2023 (original start date of July 2022 was delayed due to high prices).

Unlike in the United States, very little domestic yellow grease (UCO) and tallow is used as feedstocks, because supplies are relatively smaller. At least two Canadian biodiesel producers located near the U.S. border import animal fat and yellow grease to meet nearly all of their feedstock requirements.

There are 12 biodiesel facilities standing, with a capacity of 912 million liters, but only six facilities are operational, with a total capacity of approximately 550 million liters.

Biodiesel Feedstocks

Canola crush capacity is expected to grow from 11.3 million MT in 2021 to 17 million MT in 2025, according to a series of industry announcements. This growth is in conjunction with several announcements for new renewable diesel plants and expansions of established biodiesel facilities.

On May 18, 2022, the Canadian government [announced](#) that China has reinstated access to its market for Viterra and Richardson, the two companies that China Customs had suspended from exporting canola seed to China since March 2019.

However, as of writing, China still has a restrictive one percent dockage requirement in place on Canadian canola imports. Even with the export licenses reinstated, exports are not expected to return to levels of around 4 MMT. Further, the likelihood is high that Canadian companies will only export to China as a last resort, or if China pays cash up front (including a risk premium and premium to cover the cost of reducing dockage to levels unheard of in any other market). Even if China is willing to pay a premium, it still must compete with buyers with much lower risk profiles that have never reneged or defaulted on a contract, as well as growing domestic demand.

Canola oil sale opportunities have expanded immensely since China suspended Viterra and Richardson's exports, both domestically in the renewable fuel industry and abroad.

Section V. Advanced Biofuels

Although Canada’s production of biofuels using advanced technology platforms is limited, federal and provincial policy incentives favoring lower carbon intensity biofuels will increase (as designed) to incentivize advanced biofuels production in Canada. FAS Ottawa is aware of 3.7 billion liters of renewable diesel production capacity that has been announced to come online between 2022 and 2027. The majority of these projects are still in the engineering phase.

See FAS Ottawa’s [2021 Annual Biofuel Report](#) for further details on investments being made in Canada related to advanced biofuels, including SAF.

Section VI. Notes on Statistical Data

Ethanol Production

Ethanol production estimates are derived from two sources. First, 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 the table aggregates undenatured fuel ethanol into a “co-products” category, FAS/Ottawa adds undenatured fuel exports (HS Code 2207.10.10), and this sum comprises the ethanol fuel estimate. Undenatured fuel ethanol comprised six percent of fuel ethanol exports in 2021.

When the final, audited production data is published by Environment, Climate Change Canada, this data becomes the final production value used by FAS/Ottawa. This data is typically published with a one- to four-year delay.

Feedstock-to-Biofuel Conversion Rates Used

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

Wheat kernels: 1 MT = 393 liters

Rye/Barley kernels: 1 MT = 241 liters

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)

Animal fats/grease: 1 MT = 1,043 liters of AFME (animal fat methyl ester)

Used cooking oil (UCO): 1 MT = 1,043 liters of UCOME (UCO methyl ester)

Ethanol Fuel Exports

Ethanol fuel exports are derived from the Canadian International Merchandise Trade Web Application. HS 2207.20.10 and 2207.10.10.

Ethanol Feedstock Use for Fuel Ethanol

Ethanol feedstock estimates are derived from two sources. First, data on feedstocks used to produce denatured fuel ethanol is derived from Statistics Canada Table 25-10-0082-01, which is drawn from Statistics Canada's Monthly Renewable Fuel Survey of fuel producers. Because the table excludes feedstocks used to produce undenatured fuel ethanol, FAS/Ottawa uses known corn-to-ethanol conversion rates to estimate the amount of feedstock used to produce undenatured ethanol. We specifically use corn rates, instead of rates that apply to wheat or other possible inputs, because all undenatured fuel ethanol produced for export is produced in Ontario and Quebec, where ethanol is currently the primary ethanol feedstock.

When the final, audited feedstock data is published by ECCC, this data becomes the final feedstock values used by FAS/Ottawa. This data is typically published with a one- to four-year delay.

Ethanol Ending Stocks

Fuel ethanol ending stocks are derived from Statistics Canada table 25-10-0082-01, which includes only denatured fuel stocks. Undenatured fuel ethanol stocks are assumed to be near zero.

Biodiesel Production: Years 2013 to 2020 are derived from data submitted to ECCC by regulated facilities. Year 2021 production data is derived from Statistics Canada survey results. Capacity levels are determined by speaking with the biodiesel industry and tracking publicly available news releases from companies.

Biodiesel/Renewable Diesel Trade: Biodiesel trade data is tracked under HS code 3826.00, which covers biodiesel blended above 30 percent by volume with fossil diesel, and HS code 2710.20 for petroleum oil containing biodiesel up to and including 30 percent biodiesel by volume. All biodiesel traded under HS 3826.00 is assumed to be B99. Some RD is also erroneously reported by customs officials under the biodiesel code HS 2710.20 and HS 3826.00. Trade data is derived from the Canadian International Merchandise Trade Web Application.

Canada imports large volumes of renewable diesel, but there is currently no trade code specific to this product. The few supplying companies do not share sales data. Renewable diesel imports are estimated by evaluating the unit value of imports from Finland, the Netherlands, and Singapore – all countries with renewable diesel plants – under biodiesel code 3826.00. Those result is added to the quantity of imports from the United States to determine total renewable

diesel imports. FAS Ottawa adjusted the table for 97 million liters of biodiesel imports that were incorrectly coded as biodiesel in 2020.

New statistical subdivisions for specific biodiesel and RD import codes will be implemented effective January 01, 2022.

Statistics Canada's HS Breakout Committee reasoned:

The original request was to create breaks under HS 3826.00. After discussions with the CBSA, the CBSA identified HDRD (hydrogenation-derived renewable diesel) as not classified under heading 38.26 as it does not meet the definition of "biodiesel" in Note 7 of Chapter 38 or Subheading Note 5 of Chapter 27. Rather, it meets the description in exclusion note (b) of the Explanatory Notes to heading 38:26: "(b) Products derived from vegetable oils which have been fully deoxygenated and consist only of aliphatic hydrocarbon chains (heading 27.10).

Therefore, the breaks were created as follows under 2710.19:

- 2710.19.99.23: Diesel fuel blended with hydrogenation-derived renewable diesel (HDRD)
- 2710.19.99.93: Hydrogenation derived renewable diesel (HDRD)

Biodiesel Feedstocks: Feedstock quantity for years prior to 2017 are based on information supplied by industry and consistent with known feedstock/biofuel conversion rates. Animal fat feedstocks are taken from ECCC data. Available data on canola oil, soybean oil, and UCO feedstock data for 2017 to 2021 is either aggregated or unreliable

Attachments:

No Attachments