



Canada's CFS Program

A Review of Environment and Climate Change Canada's Proposed Regulation

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Key Points:

- The proposed regulations would require liquid fossil fuel primary suppliers to reduce the CI of the liquid fossil fuels they produce in and import into Canada from 2016 CI levels by 2.4 gCO₂e/MJ in 2022, increasing to 12 gCO₂e/MJ in 2030.
- The program goes further than other low carbon fuel programs such as in California and the EU as it will apply to any type of liquid fuel, not just those used in transportation – except for jet fuel.
- Original mandates for biodiesel (2%) and ethanol (5%) will be retained in the CFS program and those targets must still be met.
- Baseline CI values have been proposed for different fossil fuels and default pathways have been established for a range of feedstocks, including hydrogen and for electricity produced in the provinces.
- Parties can also apply for new pathways under the program.
- The proposed regulation proposes flexible, novel approaches for compliance: Supplying low CI fuels, implementing GHG reducing projects (such as CCS) and engaging in end-use fuel switching in transportation (e.g., electric vehicles, hydrogen).

Introduction

Environment and Climate Change Canada (ECCC) published its proposed [Clean Fuel Standard \(CFS\) regulations in the Canada Gazette on Dec. 19, 2020](#).

The proposed regulations would require liquid fossil fuel primary suppliers (i.e., producers and importers) to reduce the carbon intensity (CI) of the liquid fossil fuels they produce in and import into Canada from 2016 CI levels by 2.4 gCO₂e/MJ in 2022, increasing to 12 gCO₂e/MJ in 2030. This report provides a summary overview of the proposed program, and it will be updated when the program is finalized later this year.

Between 2021 and 2040, ECCC estimates the cumulative GHG emission reductions attributable to the proposed regulations are to range from 173 to 254 megatons (Mt), with a central estimate of approximately 221 Mt. To achieve these GHG emission reductions, ECCC estimates the proposed regulations could result in societal costs that range from CAN\$14.1 to CAN\$26.7 billion, with a central estimate of CAN\$20.6 billion. The expected GHG emission reductions would be achieved at an estimated societal

cost per ton between approximately CAN\$64 and CAN\$128, with a central estimate of CAN\$94.

Canada’s program goes further than other low carbon fuel programs such as in California and the EU as it will apply to any type of liquid fuel, not just those used in transportation – except for jet fuel. With respect to the latter, ECCC notes, “Jet fuel that is used for international flights would not be subject to the proposed Regulations. The treatment of domestic aviation fuels and credit creation for low CI aviation fuels is still under consideration and is being examined in conjunction with carbon pollution pricing policies.” The government originally intended to include gaseous and solid fuels as well, but ultimately decided that was too complicated an approach that would hinder the development and promulgation of the current proposed program. Annual CI reduction requirements are summarized in Table 1.

Table 1: Annual Liquid Lifecycle CI Reduction Requirements for Primary Suppliers

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CI reduction requirement (gCO ₂ e/MJ)	n/a	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Liquid class credit reference CI value (gCO ₂ e/MJ)	90.4	90.4	89.2	88.0	86.9	85.7	84.5	83.4	82.2	81.0

Source: Canada Gazette, December 2020

In addition, ECCC proposes to retain the minimum volumetric requirements (at least 5% low CI fuel content in gasoline and 2% low CI fuel content in diesel fuel and light fuel oil) currently set out in the federal Renewable Fuels Regulations (RFR) that were implemented in 2010. The RFR program itself would be repealed and the new provision of the CFS regulation incorporating the two volumetric requirements would take effect on Jan. 1, 2023.

The timeline for finalizing and implementing the major milestones in the regulation have been proposed as follows:

- Dec. 1, 2022: Coming into force of CI limits.
- Jan. 1, 2023: Coming into force of volumetric requirements; coming into force of land use and biodiversity criteria.
- Jan. 31, 2023: First Credit Creation Reports (these must be submitted in the form of an annual report and include information on credits that were provisionally created in 2021 and 2022).
- Apr. 30, 2023: Quarterly report submission begin for production and importation of low CI fuels.
- Jan. 1, 2024: First opportunity to contribute to a registered emissions reduction program.
- June 30, 2024: First Compliance Report to be submitted.

CI Baseline Values, Fuel Limits and Default Pathways

The proposed regulations set out the baseline CI values for each fossil fuel type (e.g., gasoline or heavy fuel oil) produced in and imported for use in Canada, as well as fuel limits, which are summarized in Table 2.

Table 2: CI Baseline Value and Fuel Limits for Included Fossil Fuel Types

Item	Liquid Fossil Fuel	Baseline CI Value gCO ₂ e/MJ	Limit per compliance period, in gCO ₂ e/MJ from Dec. 1 to Dec. 31, 2022	2023	2024	2025	2026	2027	2028	2029	2030 and after
				1	Gasoline	96	93.6	92.4	91.2	90.0	88.8
2	Diesel	96	93.6	92.4	91.2	90.0	88.8	87.6	86.4	85.2	84.0
3	Kerosene	87	84.6	83.4	82.2	81.0	79.8	78.6	77.4	76.2	75.0
4	Light Fuel Oil	95	92.6	91.4	90.2	89.0	87.8	86.6	85.4	84.2	83.0
5	Heavy Fuel Oil	98	95.6	94.4	93.2	92.0	90.8	89.6	88.4	87.2	86.0
6	Jet Fuel	88	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0

Source: Canada Gazette, December 2020

GHG emissions from all stages in a fuel's lifecycle are included in the determination of the baseline CI values. The annual CI reduction requirements (e.g., 12 gCO₂e/MJ in 2030) that primary suppliers would have to meet for the fuels they supply to Canada is the difference between the baseline CI value and the CI limit for that fossil fuel type, similar to the California Low Carbon Fuel Standard, for example. All fossil fuel types have the same annual CI reduction requirement. The proposed regulations do not differentiate fossil fuels based on crude oil type, or whether the crude oil is produced domestically or imported into Canada.

To meet the minimum volumetric requirements incorporated from the RFR, each primary supplier would be required to demonstrate for each compliance period that, of the total number of compliance credits it retires for compliance, a minimum (equivalent to 5% of its gasoline pool and 2% of its diesel and light fuel oil pool) is from low-CI fuels. These compliance credits are part of the total credits used to meet reduction requirements, but the same compliance credit cannot be used to meet the 2% and 5% requirements respectively. Primary suppliers who have surplus compliance units under the RFR would be able to convert these units into credits under the proposed regulations after the end of the final compliance period of the RFR.

Select default values included in the proposed regulation are summarized in Table 3.

Table 3: Select Default Lifecycle CI Values

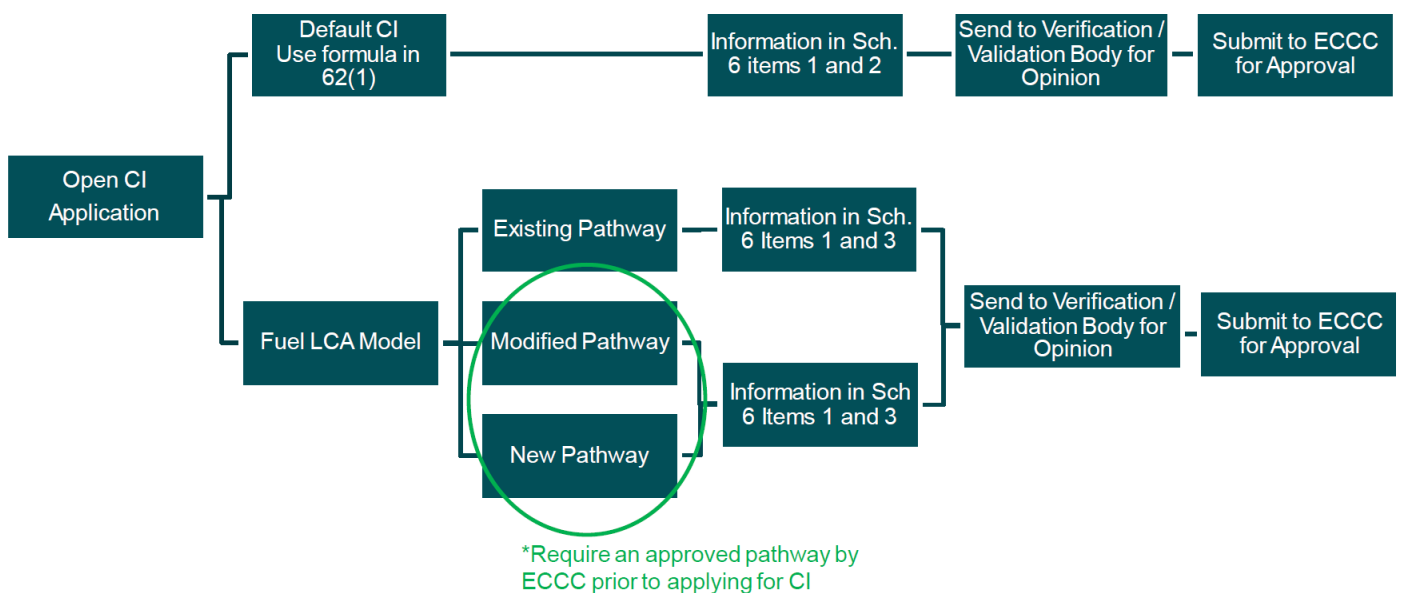
Feedstock	Default Value CO ₂ e/MJ
Animal materials, including manure	0
Used animal litter or bedding that was not deliberately used for the purpose of creating fuel	0
Used or inedible organics from a residential area, a retail store, a restaurant, a caterer or a food processing plant that was not deliberately used or allowed to become inedible for the purpose of creating fuel	0
Used fat and used vegetable oils that were not deliberately used for the purpose of creating fuel	0
Used construction and demolition materials	0
Industrial effluents	0
Municipal wastewater	0
Residues that are directly generated by agriculture, aquaculture and fisheries, but not residues from related industries or from processing,	0
Water	0
A waste processing facility that produces biogas	0
Carbon dioxide that has been captured from the atmosphere	0
Secondary forest residues that are byproducts of industrial wood-processing operations, and	0
Forest biomass from clearing activities not related to harvesting, including infrastructure installation, fire prevention and protection, pest and disease control, and road maintenance	0
Feedstock sourced from crops grown solely for energy production purpose and that are not traditionally grown for food and feed purposes	25
Fuel produced from any other feedstock	35

Source: Canada Gazette, December 2020

In addition to these feedstocks, the proposed regulation sets default lifecycle CI values for various types of hydrogen and electricity generated in each of Canada’s provinces.

Regulated parties can apply for new pathways as well. Figure 1 summarizes the application and approval process for low CI fuels. There are similar processes proposed for compressed and liquefied gases, and electricity.

Figure 1: Flow Chart for New Pathway Approval Process for Low CI Fuels



Source: ECCC, December 2020

Compliance Categories and Credit Generation

Credits may be created by primary suppliers or voluntary credit creators who take one of the following actions:

- **Compliance Category 1:** actions throughout the lifecycle of a fossil fuel that reduce its CI (through GHG emission reduction projects);
- **Compliance Category 2:** supplying low CI fuels (such as ethanol or renewable diesel); or
- **Compliance Category 3:** end-use fuel switching in transportation (when an end user of fuel changes or retrofits their combustion devices to be powered by another fuel or energy source, such as electricity in transportation).

For **Compliance Category 1**, ECCC will define quantification methodologies for the following types of projects:

- CCS;

- low-carbon intensity electricity integration;
- enhanced oil recovery; and
- co-processing of biocrudes in refineries and upgraders.

Eligible projects must be conducted in Canada and reduce the CI of a fossil fuel at any point along its lifecycle, achieve incremental GHG emission reductions, and must have begun to reduce, sequester, or use CO₂e emissions on or after July 1, 2017. Project proponents would first apply to the Department to have a project recognized for credit creation and would submit a validation report. Each year, they would report information specified in the appropriate quantification method that is accompanied by a third-party verification report and a verification opinion.

Credits would be created for 10 years for emission reduction projects, except for CCS projects, which would create credits annually for a minimum of 20 years. In addition, projects may be renewed a single time for an additional 5 years after the initial crediting period, provided an applicable quantification method still exists at the time of renewal.

Compliance Category 2 encompasses credits that would be created under the proposed regulations for low CI fuels produced or imported in Canada. Low CI fuels are fuels, other than the fossil fuels subject to the CI reduction requirements, that have a CI equal to or less than 90% of the credit reference CI value for the fuel. ECCC notes that most low CI fuels available on the market are forms of biofuels but other low CI fuels such as synthetic fuels, such as those made from the CO₂ captured from the atmosphere as a result of direct air capture or syngas generated from any biomass resource, could qualify.

All low CI fuels supplied to the Canadian market, including fuels used to comply with existing federal and provincial renewable fuel regulatory requirements and British Columbia's Renewable and Low Carbon Fuel Requirements Regulation, would be able to create credits under the proposed regulations. Credits may be created for liquid and gaseous low CI fuels as of the date of registration of the final regulations. Credits for low CI fuels would be created based on the amount of low-carbon fuel they supply to the Canadian market annually (in MJ), the difference between the lifecycle CI of the low CI fuel, and the credit reference CI value for the fuel. In order to create credits, a low CI fuel producer or foreign supplier would be required to obtain an approved CI value for each low CI fuel that they produce or import. The proposed regulations would require the use of either the Fuel Lifecycle Assessment (LCA) Model, which ECCC is still developing, to calculate facility-specific CI values using facility-specific data, or the use of disaggregated default values available in the proposed regulations.

To prevent adverse impacts on land use and biodiversity stemming from the increased harvest and cultivation of these feedstocks, the proposed regulations establish **land-use and biodiversity (LUB)** criteria that are aligned to the U.S. Renewable Fuel Standard (RFS2). Only biofuels made from biomass feedstock that adhere to the LUB criteria would be eligible for compliance credit creation. These criteria apply to feedstock regardless of geographic origin. The criteria do not apply to feedstock that is not biomass (e.g., fuel made from direct air capture) or that is designated "low-concern biomass feedstock" (e.g., municipal solid waste).

Compliance Category 3, specified end-use fuel switching in transportation, enables credit creation for changing or retrofitting a fossil fuel combustion device to be powered by another fuel or energy source, such as electric vehicles (EVs). ECCC says this does not directly reduce the CI of fossil fuels but reduces GHG emissions by displacing gasoline or diesel used in transportation by fuels or energies with lower CIs. Credits would be created by:

- The owners or operators of a fueling facility that supplies fuels for transportation uses,
- The producers and importers of low CI fuels used for transportation purposes,
- The owners or operators of hydrogen fueling stations for dispensing hydrogen to hydrogen fuel cell vehicles,
- Charging network operators for residential and public charging of EVs¹,
- Charging site hosts for private or commercial charging of EVs.

Credit for residential charging of EVs would be phased out by the end of 2035 for charging stations installed by the end of 2030. Any residential charging station installed after the end of 2030 would not be eligible for credits after 2030. The proposed regulations would require charging network operators to reinvest 100% of the proceeds from the sale of credits created by residential and public EV charging either by:

- Reducing the cost of EV ownership through financial incentives to purchase or operate an EV, or
- Expanding charging infrastructure in residential or public locations, including EV charging stations and electricity distribution infrastructure that supports EV charging.

A primary supplier may also use the compliance fund mechanism by contributing to an eligible “registered” funding program in order to satisfy up to 10% of its annual reduction requirement. The credit price under this mechanism is set in the proposed regulations at \$350 in 2022 (consumer price index adjusted) per compliance credit. The credits created by these investments cannot be traded and would expire if not used for that compliance period. Primary suppliers may create credits by contributing to a registered funding program between January 1 and June 30, as well as between November 1 and November 30 following the end of a compliance period.

Fuels Supplied and Credits Generated

Table 3 shows the amount of fossil and low-carbon fuels supplied in Canada in the regulatory scenario between 2021 and 2030, as projected by ECCC. In 2022, it is estimated that there would be 130 PJ of low-carbon fuel supplied in Canada. In 2026, credits from baseline activities and banked credits would no longer be sufficient to fulfill the annual CI reduction requirement. Therefore, it is estimated that biodiesel blending in diesel and LFO

¹ There had been discussion about which entity should be the default credit generator: utilities, EV manufacturers or original equipment manufacturers, but ultimately ECCC thought that network charging operators should be the default generator. However, ECCC is requiring them to invest the proceeds of credits generated so that the EV charging network in Canada expands to support EV uptake.

would increase above baseline levels in 2026 (at 142 PJ) while ethanol blending in gasoline and hydrogenation-derived renewable diesel (HDRD) blending in diesel and light fuel oil (LFO) would increase above baseline levels in 2027 (at 180 PJ). Blend levels are assumed to increase linearly to the assumed blend rates in 2030 (at 293 PJ). The annual supply of low-carbon fuels remains relatively constant at 2030 levels between 2031 and 2040, according to ECCC.

Table 3: Fossil and Low-Carbon Fuels Supplied in the Regulatory Scenario (PJ)

	2021–2025	2026–2029	2030	2031-2040	Total
Gasoline	6,597	4,821	1,129	11,029	23,577
Diesel	5,858	4,494	1,071	10,850	22,273
LFO	304	214	49	458	1,025
Ethanol	418	439	152	1,489	2,498
Biodiesel	119	178	64	643	1,004
HDRD	119	177	76	764	1,136

Source: Canada Gazette, December 2020

ECCC says the proposed regulations would provide incentive for low carbon fuel suppliers to obtain more credits by reducing the CI of the low-carbon fuels they supply, similar to California, but acknowledges there is uncertainty as to how much the CI values of these fuels might decline over time. Therefore, ECCC assumed that the lifecycle CIs of low carbon fuels remain constant over time.

Table 4 shows the total number of credits estimated for supplying low-carbon fuels by fuel type between 2021 and 2030, focusing on ethanol, biodiesel and HDRD. Primary suppliers who have surplus compliance units under the RFR would be able to convert these units into credits under the proposed regulations. Therefore, there would be a one-time rollover of credits from the RFR in 2022 estimated at 1.4 million based on departmental data from the RFR (as presented to stakeholders in the June 2020 consultations). In 2022, credits from low-carbon fuel blending are estimated at 6.4 million, increasing to 6.5 million in 2026, to 8.1 million in 2027, and 12.4 million in 2030. Between 2031 and 2040, annual credits for supplying low-carbon fuels remain relatively constant at 2030 levels.

Table 4: Estimated Credits from Low-Carbon Fuels by Fuel Type (millions)

	2021–2025	2026–2029	2030	2031–2040	Total
Ethanol	13.6	15.2	4.9	47.6	81.3
Biodiesel	6.2	10.4	3.6	36.0	56.3
HDRD	5.8	9.7	4.0	39.8	59.2
Total	25.6	35.4	12.4	123.4	196.8

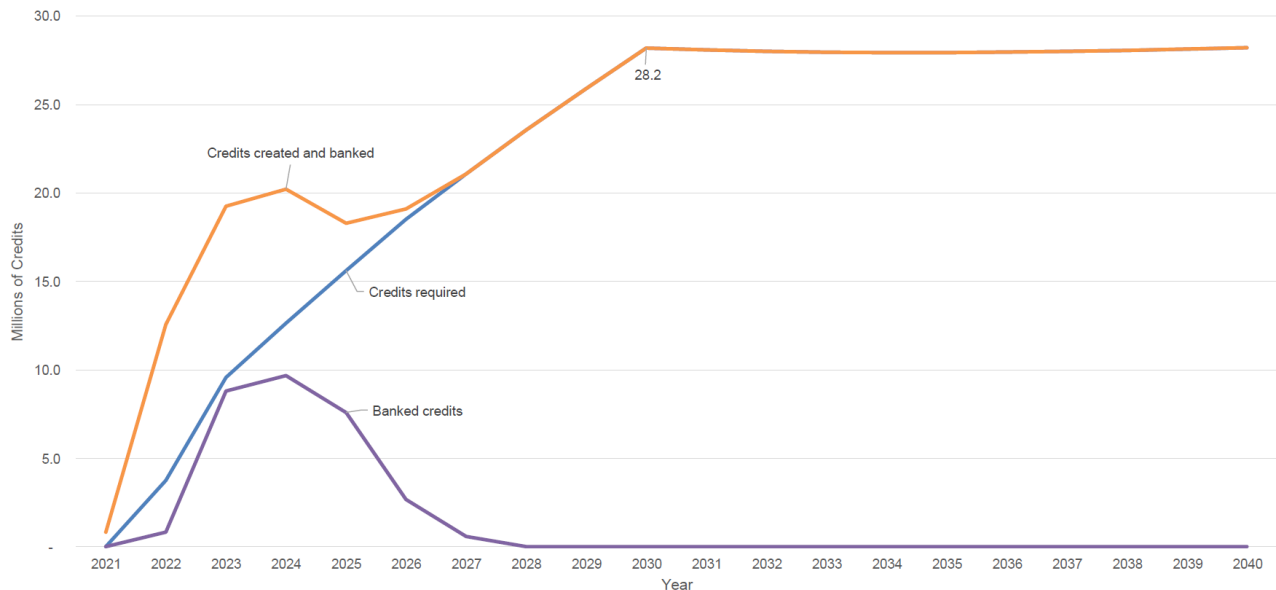
Source: Canada Gazette, December 2020

ECCC estimates that credit creation from actions that are expected to occur in the baseline, such as credits from low-carbon fuels supplied for federal and provincial blending mandates, plus banked credits from previous years would be sufficient to fulfill the regulatory requirements for the first few years that the proposed regulations are in force (2021 to 2025), as shown in Figure 2. By 2026, ECCC says that credits from

incremental actions would be required, and it is estimated that 2027 is the last year in which banked credits would be used and the first year in which the fund would be accessed.

In 2028, it is estimated that credits from emerging technologies would be required to fulfill the annual CI reduction requirement. The fund and emerging technology pathways represent the highest cost compliance options that are available when cheaper options have all been exhausted. Emerging technologies make up the difference between the amount of credits required and credits from known pathways. ECCC assumed these would cost the same as the fund. The proposed regulations reach full stringency in 2030 and credits created reach a peak of 28.2 million and then remain relatively constant at 2030 levels from 2031 to 2040, according to ECCC's analysis.

Figure 2: Estimated Credits Required, Created and Banked, 2021-2040



Source: ECCC, December 2020