

B.C. Low Carbon Fuel Standard: Refinery Improvement Credits Discussion Paper

July 5, 2019

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1 Introduction

The *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act* (Act) and the *Renewable and Low Carbon Fuel Requirements Regulation* (Regulation) are together referred to as the B.C. Low Carbon Fuel Standard (BC-LCFS). The Ministry of Energy, Mines and Petroleum Resources (Ministry) is considering amendments to the BC-LCFS.

The purpose of this paper is to discuss potential amendments to recognize actions taken at refineries that change the quantity of greenhouse gas (GHG) emissions associated with the production of fossil fuels supplied to the British Columbia market. The regulations would recognize the incremental difference between the carbon intensities of fuels produced at refineries updated or constructed since 2010 and the baseline carbon intensities for the refinery products in 2010 while maintaining a level playing field and avoiding crude shuffling. Crude shuffling is the practice of managing records for crude oil to show that the products sold into British Columbia result from low carbon crudes, while products sold

elsewhere result from the high carbon crudes. No actual carbon intensity reductions occur as a result.

The Ministry is seeking feedback on these potential changes. Responses must be in writing and must be submitted by email or mail before 4 p.m. on August 16, 2019 to one of the following addresses:

Email: lcfr@gov.bc.ca

Mail: Low Carbon Fuels Branch
B.C. Ministry of Energy, Mines, and
Petroleum Resources
P.O. Box 9380 Stn Prov Govt
Victoria, B.C. V8W 9M6

This discussion paper and a response form for public and stakeholder comment can be accessed on the Ministry's website at:
<https://gov.bc.ca/lowcarbonfuels>.

The Ministry is concurrently releasing two additional discussion papers:

- 1) A discussion paper regarding a possible compliance assurance mechanism.
- 2) A general discussion paper regarding amendments related to points of compliance,

energy effectiveness ratios, new fuel classes, Part 3 Agreement eligibility, and the small supplier exemption.

2 Background

Under the BC-LCFS policy, fuel suppliers must progressively decrease the average carbon intensity of their fuels to achieve a 10% reduction in 2020 and 20% reduction in 2030. The carbon intensity of a fuel represents the greenhouse gas emissions associated with its production and use as determined by a lifecycle assessment, presented in terms of grams of carbon dioxide equivalent per mega joule ($\text{gCO}_2\text{e/MJ}$) of the produced fuel. A lifecycle assessment considers the emissions associated with each stage of a fuel product's life and all materials and energy used from feedstock production or acquisition through fuel use.

A fuel supplier generates credits by supplying fuel with a carbon intensity below the prescribed target, and they incur debits by supplying fuel with a carbon intensity above the target (e.g. petroleum-based gasoline and diesel). To remain compliant, a fuel supplier must ensure that debits incurred from supplying higher carbon fuels are offset by credits generated from supplying lower carbon fuels. A fuel supplier can bank surplus credits if they over-comply with the carbon intensity target in a given year; they can also purchase credits from other fuel suppliers.

After extensive consultations in 2011, the Ministry responded to the fossil fuel industry's request to set a single carbon intensity for gasoline and a single carbon intensity for diesel fuel. The Regulation now prescribes one carbon intensity for petroleum-based gasoline ($88.14 \text{ gCO}_2\text{e/MJ}$) and one for petroleum-based diesel ($94.76 \text{ gCO}_2\text{e/MJ}$). While this was done partially in response to the fossil fuel industry's request, it was intended primarily to avoid crude shuffling by producers while British Columbia was the only Canadian

province implementing carbon intensity requirements. The potential for shuffling remains and the Ministry intends to maintain fixed default carbon intensities for petroleum-based gasoline and petroleum-based diesel fuel.

The single carbon intensities were also introduced to create a "level playing field" at the introduction of the BC-LCFS. The refineries in Western Canada are part of a highly rationalized industry where each refinery is optimized for a particular balance of crude oil, and the refiners exchange crude oil to enable each crude feedstock to be processed at the most appropriate refinery. If the BC-LCFS were to discriminate between crude feedstocks, it is not clear how the industry would be able to respond effectively to their need to reduce the carbon intensity of the refined products.

Recently, fuel suppliers have begun requesting that greenhouse gas reductions at refineries be recognized for compliance credits. As well, a new refinery is now online, and it was designed to minimize the carbon intensities of products made from crude oil that has a high carbon intensity.

3 Project Eligibility

Refineries are complex systems with multiple product streams moving through multiple process units. The arrangement of process units and the magnitude and type of product flows may differ greatly between refineries. The operating conditions are variable, and individual refineries may employ differing data collection methodologies to monitor their operating parameters. Recognition of process changes will require a flexible approach regarding the types of eligible projects and how the emission reductions associated with those projects are quantified and verified.

To avoid altering the default carbon intensities of petroleum-based gasoline and diesel fuel, the Ministry intends to introduce a "Carbon Intensity

Modifier,” which would be the change in carbon intensity attributed to a fossil fuel produced under an approved project plan.

The Ministry is considering the following factors for determining whether a specific project is eligible for consideration:

- Projects must be completed after 2010.
- Projects must adhere to an approved protocol.
- Projects must have a well understood and quantifiable impact on the fuel carbon intensity. These could include projects such as carbon capture and storage and fuel switching.
- Project benefits must exceed a threshold value of carbon intensity reductions.
- The quantity of credits would be determined by the amount of fuel supplied in B.C.

These factors will be discussed further below.

In the case of refineries constructed since 2010, the Ministry intends to follow a similar approach to that described below for determining Carbon Intensity Modifiers, but a universal protocol would not be developed. Instead, the fuel producer would be required to provide all relevant information needed to enable the Ministry to determine the Carbon Intensity Modifiers for all regulated products produced at the new refinery.

3.1 Project Timing

Given that the intent to require carbon intensity reductions by implementing a BC-LCFS was announced in 2007 and implemented by 2010, the Ministry feels that it is appropriate to recognize any changes to the refining industry that have been completed since the Act came into force on January 1, 2010.

For refineries that were supplying fuel to the B.C. market in 2010, projects would be evaluated relative to the specific carbon intensity of that refinery and the Carbon Intensity Modifier would be calculated relative to the common default carbon intensity.

3.2 Project Quantification

The Ministry is aware that a number of methodologies exist for quantifying the impact of GHG reduction projects, and would welcome comments identifying those methodologies as well as comments regarding their suitability, or concerns regarding their use to quantify refinery changes.

To ensure flexibility, the Ministry is considering allowing proponents to propose alternative methods that rely on evidence from metering data, invoices, engineering estimates or design data, equipment specifications and/or professional accounting methods. The Ministry will consider whether these proposals should be subject to public peer review before being approved for use.

The Ministry is considering setting an absolute threshold to require a change of at least 0.5gCO₂e/MJ in at least one fuel before projects will be considered.

3.3 Project Boundary

In the case of refineries that were not supplying fuel to B.C. in 2010, the full refinery operation would be evaluated to determine the appropriate Carbon Intensity Modifiers.

For refineries that were supplying fuel to B.C. in 2010, a “project system boundary” would be identified, to limit the project scope to only the factors that have a meaningful impact on the product’s carbon intensity. A project system boundary simplifies project quantification by isolating the project from the larger refinery system and should be limited to the smallest scope that recognizes the project impact while allowing for a realistic analysis. The number and type of refinery process units considered within the project system boundary would depend on the type and scale of the project. The project system could be expanded beyond the refinery itself to include improvements upstream or the displacement of emissions downstream.

Quantification must be restricted to only those carbon intensity components (see Regulation section 11.05) of the fuel lifecycle that are significantly impacted by the project.

The project system boundary must include all direct effects of the project and all indirect effects where energy use or GHG emissions increase as a result of the project. Applicants may also propose to extend the project boundary to include those process units where indirect effects result in lowered energy use or emissions.

Changes must be determined through the direct comparison of pre- and post- project GHG emissions, using appropriate and consistent quantification methods. If more than one fuel is impacted by the project, the changes in emissions must be allocated to all regulated fuels using allocation methods consistent with principles used by GHGenius.

3.4 Determining the Carbon Intensity Modifier

Project proponents would be required to propose a methodology for determining a Carbon Intensity Modifier for each fuel subject to the Act. The Carbon Intensity Modifier recognizes the change in fuel carbon intensity attributable to the project, and for the purposes of the Regulation, the fuel itself would not be considered to have a unique carbon intensity. Consideration could be given to recognizing the emission reduction benefits to non-regulated products through co-product allocation methods if appropriate.

An approved project protocol would include the methodology used to quantify the change in carbon intensity of Part 3 fuels. The change would be specific to each fuel relative to a refinery-specific baseline. For new refineries, the change would be relative to the default carbon intensities prescribed in the Regulation, which are the average carbon intensities of petroleum-based

gasoline and petroleum-based diesel fuel supplied in B.C. in 2010.

Essentially, the Carbon Intensity Modifier would be the change in carbon intensity resulting from the project for each regulated fuel, such that

$$\Delta CI_{Fuel} = CI_{Fuel\ Before} - CI_{Fuel\ After}$$

3.5 Accountability and Record Keeping

The proponent would be required to provide access to any records the Ministry requires to confirm all claims regarding the impact of the project. This includes records supporting any claims made regarding activities upstream or downstream of the refinery.

Upon approval, aspects of the facilities within the project boundary would be subject to inspection under the Act and the Regulation. The Ministry is considering whether independent third-party verification would be an acceptable alternative to verify any claims made by a proponent.

Once a project has been approved and a Carbon Intensity Modifier has been established, if the proponent becomes aware that operations within the project system boundary have changed or will change they would be required to provide immediate written notice to the Ministry.

3.6 Project Protocols

In order to simplify the approval process for multiple projects of the same type, and in order to allow for public review of projects without revealing confidential data, the Ministry is considering a process that includes the publication of approved Project Protocols. The Project Protocols would include a description of the project, identification of the significant project details and the data that must be monitored, and a methodology for calculating the Carbon Intensity Modifier for each Part 3 fuel.

Upon receipt of a project proposal, the Ministry would determine whether an appropriate Project

Protocol has been published. If so, the project would be reviewed for approval within the scope of the Project Protocol. If not, the Ministry would establish and publish a Project Protocol based on the project proposal before proceeding with the project review.

Projects must be approved before credits can be generated, and proposals must contain specific details and data, as well as verifiable calculations of the proposed Carbon Intensity Modifiers for the fuels in question.

Upon approval of the project, the Ministry would identify the Project Protocol and publish the Carbon Intensity Modifier for each fuel.

4 Credit Generation

The credits generated by fuels produced under an approved project and supplied in B.C. would be proportional to both the Carbon Intensity Modifier and the quantity of that fuel supplied in B.C., as shown in the following formula.

$$Credits = \Delta CI_{Fuel} \times Q_{Fuel} \times EC_{Fuel} \div 1,000,000$$

Where:

$$\Delta CI_{Fuel} = \text{the Carbon Intensity Modifier approved for the Modified Fuel (gCO}_2\text{e/MJ)}$$

Q_{Fuel} = the quantity of Modified Fuel that was supplied in B.C. in the compliance period

EC_{Fuel} = the energy content of the Modified Fuel

Fuel suppliers would be able to apply the Carbon Intensity Modifier both to Part 3 fuel supplied by the refiner and to Part 3 fuel acquired through inter-refiner agreements, provided that the quantity of that type of Part 3 fuel does not exceed the quantity of the same type of Part 3 fuel produced at the refinery and supplied in B.C. in the same year.

If the supplier wishes to transfer fuel with the Carbon Intensity Modifier to another supplier, documentation similar to that required for low carbon fuels under section 11.031 of the Regulation would be required.

Suppliers would be required to report both the quantity of Part 3 fuel produced under an approved project and the quantity supplied in B.C. as part of their annual reporting obligations.

The Ministry does not intend to distinguish between credits earned through the supply of Modified Fuel or those earned through any other means.