

**CLEAN FUEL REGULATIONS:**  
QUANTIFICATION METHOD  
FOR LOW CARBON-INTENSITY  
ELECTRICITY INTEGRATION



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# Preface

The proposed *Clean Fuel Regulations* would require fossil fuel primary suppliers (i.e., producers and importers) to reduce the carbon intensity of the fossil fuels they produce in and import into Canada. These proposed Regulations would also establish a credit market whereby the annual CI reduction requirement could be met via three main categories of credit-creating actions, including carrying out a Equivalent Carbon Dioxide (CO<sub>2</sub>e) emissions reduction or removal project in respect of fossil fuels. Environment and Climate Change Canada (ECCC) provides the *Quantification Method for Low-Carbon Electricity Integration* to determine the reductions from eligible projects of this type.

The full text of the proposed Regulations and associated documents are available on the Canadian Environmental Protection Act Registry website:

<https://pollution-waste.canada.ca/environmental-protection-registry/regulations#page>

If you have questions about the proposed *Clean Fuel Regulations*, please contact the following email address: [ec.cfsncp.ec@canada.ca](mailto:ec.cfsncp.ec@canada.ca).

# Disclaimer

This document does not in any way supersede or modify the *Canadian Environmental Protection Act, 1999* or the proposed *Clean Fuel Regulations*, or offer any legal interpretation of those proposed Regulations. Where there are any inconsistencies between this document and the Act or the Regulations, the Act and the Regulations take precedence.

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# Introduction

This quantification method (QM) is intended for use by participants applying to have a CO<sub>2</sub>e Emissions Reduction or Removal Project recognized to create credits under the proposed *Clean Fuel Regulations* (proposed Regulations).

Credits can be created under the proposed Regulations with this quantification method through the integration of Low Carbon-Intensity (CI) Electricity Sites. These sites convert the energy from low CI energy sources into electrical energy as the end product, and supply that electricity to a facility that produces, processes, stores, transports or distributes fossil fuel products (Fossil Fuel Facility). Emission reductions are quantified based on the amount of electricity from either fossil fuel-based sources or purchased from the electrical network that is replaced with low carbon-intensity electricity consumed by the Fossil Fuel Facility. Emission reductions in this quantification method are calculated based on a life cycle approach, as life cycle carbon intensities are used to account for the emissions associated with the electricity.

## Terms and Definitions

**Electrical network:** a network for the distribution of electricity that is subject to the standards of the North American Electric Reliability Corporation.

**Fossil Fuel Facility:** a facility that produces, processes, stores, transports or distributes liquid, gaseous or solid fossil fuel products (either raw materials upstream of refining or finished fuels).

**Low carbon-intensity (CI) electricity:** for the purposes of this quantification method, low carbon-intensity electricity includes any electricity source listed in Table 38 of the *Fuel LCA Model Methodology* with a carbon intensity below 40 gCO<sub>2</sub>e/MJ, excluding any electricity generated from co-generation.

**Low Carbon-Intensity (CI) Electricity Site:** a location where the low CI electricity is generated by converting low CI alternative energy sources into electrical energy as the end product and delivered to the Fossil Fuel Facility during the CO<sub>2</sub>e emissions reduction project.

## Eligibility

To demonstrate that a CO<sub>2</sub>e emission reduction project meets the requirements under this quantification method, the participant must supply sufficient evidence that:

1. The quantification of reductions achieved by the project is based on actual measurement and monitoring (except where indicated in this quantification method).
2. The low CI electricity is generated and consumed at a Fossil Fuel Facility or provided directly to a Fossil Fuel Facility from a separate Low CI Electricity Site, and not provided through an electrical network.
3. The low CI electricity is not consumed as an energy source for electric vehicles at the Fossil Fuel Facility.

4. The Low CI Electricity Site commenced generation on or after July 1, 2017.
5. The metering of the low CI electricity consumption at the Fossil Fuel Facility is made at a point downstream of both the electricity generator and any storage system, typically where generated electricity is connected to a load.

# Crediting

## Crediting Period

CO<sub>2</sub>e emission reduction projects using this quantification method are eligible to create credits under the proposed Regulations for a period of 10 years from the day on which the project is recognized by the Minister. An extension of the crediting period may be permitted as per section 29(3) of the proposed Regulations.

## Credit Creators

The owner or operator of a Fossil Fuel Facility that is consuming the low CI electricity is the default creator. This person must register as a credit creator as per section 24 of the proposed Regulations before creating credits under the proposed Regulations.

If more than one participant applies for credits for the same project and it is not clear which party is entitled to register, no credits will be granted to that project until an agreement is reached by the participants to designate the registered creator.

The registered creator may differ from the default, if the owner or operator of the Fossil Fuel Facility enters into an agreement with another participant to create credits for the CO<sub>2</sub>e emission reduction project in accordance with section 21 of the proposed Regulations.

## Class of Credits Created

The class of credits created depends on the type of product produced by the Fossil Fuel Facility, and the fuel class that corresponds to the physical state of the finished fuel at standard conditions. If the product is an intermediary product to a finished fossil fuel, it is considered part of the fuel class that corresponds to the physical state (at standard conditions) of the finished fuel. Credits can be allocated between any fuel classes that make up more than 10% of that Fossil Fuel Facility's products, on an energy basis. Subsection 23(4) of the proposed Regulations applies regarding this election.

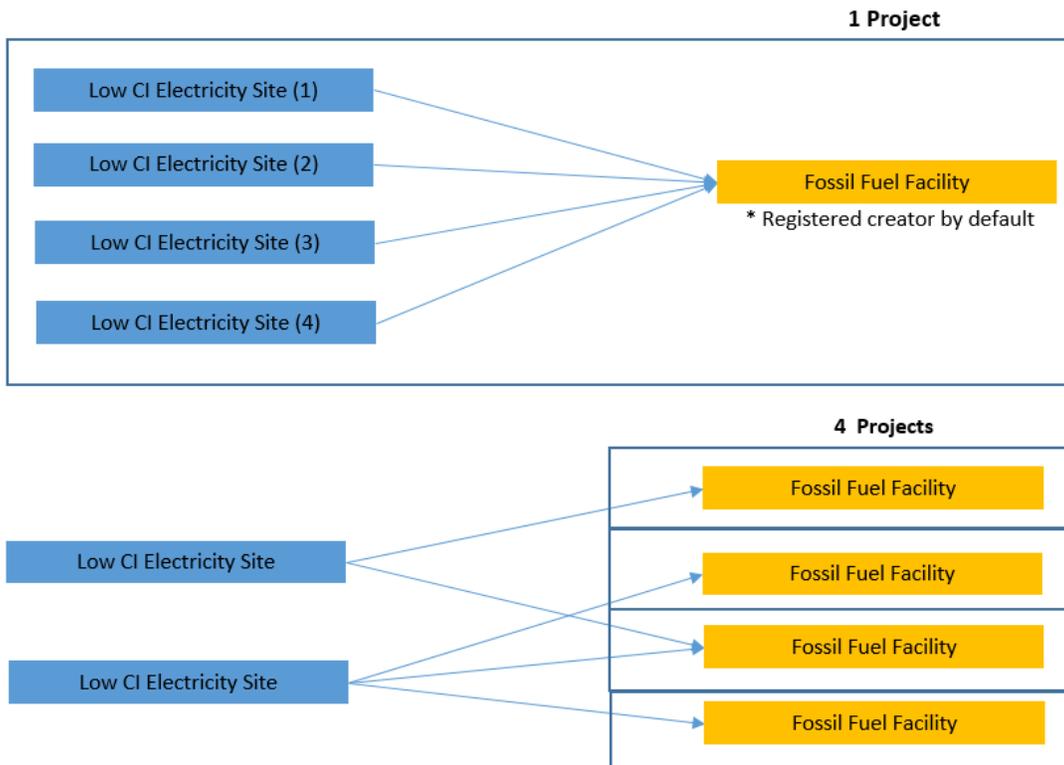
# Project Scenario

## Project Locations

A project must include one Fossil Fuel Facility and at least one Low CI Electricity Site. The Low CI Electricity Site and the Fossil Fuel Facility may be at the same location or separate locations. Where the Low CI Electricity Site and the Fossil Fuel Facility are located on a single property or group of adjacent properties owned or operated by the same legal entity, they will be considered as a single project location. Where one or multiple Low CI Electricity Site(s) and the Fossil Fuel Facility are located on non-adjacent properties, they will be considered as separate project locations. Each project location must be uniquely identified using the civic address or the global positioning system (GPS) coordinates (3 decimals). A boundary file demonstrating the project location(s) must also be provided that includes aerial photographs, maps or satellite imagery.

## Project Aggregation

Multiple Low CI Electricity Sites can be aggregated into a single project, if they supply electricity to a single Fossil Fuel Facility and provide the same type of electricity. A given Low CI Electricity Site may be part of multiple projects where it supplies low CI electricity to multiple Fossil Fuel Facilities, as long as there is appropriate metering at each Fossil Fuel Facility. If a single Low CI Electricity Site supplies multiple types of electricity, the types of electricity can be aggregated into a single project, if metering is available for each electricity type. The electricity supplied by a given Low CI Electricity Site to a given Fossil Fuel Facility must only be included in a single project, to prevent double counting of the low CI electricity.



## Project Sources

ECCC may periodically update the electricity carbon intensities used to quantify the project emissions in Table 38 in the *Fuel LCA Model Methodology*. The carbon intensities published in the version of *Fuel LCA Model Methodology* for the compliance period in which credit creation is occurring must be used.

The *Fuel LCA Model Methodology* provides the methodology and data sources used to determine electricity carbon intensities.

# Baseline Scenario

## Baseline Identification and Selection

The baseline scenario for projects using this quantification method is defined as the electricity that is either from fossil fuel-based sources (such as natural gas simple cycle, co-generation, etc.) or the electrical network, which is replaced by the low CI electricity consumed at the Fossil Fuel Facility. For new facilities, a default is prescribed for the baseline electricity source. The baseline is dynamic and will be quantified annually, as the amount of electricity will change depending on the measured electricity consumption from the Low-CI Electricity Site(s) during the project period. The baseline electricity source(s) and the proportion of electricity from the source(s) will remain static throughout the crediting period; however, the baseline carbon intensities may be updated periodically in Table 37 or 38 in the *Fuel LCA Model Methodology*. The carbon intensities published in the version of *Fuel LCA Model Methodology* for the compliance period in which credit creation is occurring must be used.

- **For existing facilities**, participants must identify and select the baseline electricity source that is being displaced by the low CI electricity.
- **For existing facilities that have increased electricity consumption on site** and that are using low CI electricity to meet the increased demand, the baseline will be a weighted average of all electricity sources consumed prior to the project.
- **For new facilities**, there are two baseline options:
  - If connected to the electrical network, new facilities should consider the provincial or territorial electrical network as the baseline electricity source.
  - If there is no connection to the electrical network, new facilities should consider the baseline to be an electricity source from natural gas simple cycle.

## Baseline Sources

The *Fuel LCA Model Methodology* provides the methodology and data sources used to determine electricity carbon intensities.

# Quantification Methods

## Emission reduction quantification

To determine the total emission reductions for the compliance period, the following equation must be used:

$$Emissions\ Reductions\ (tCO_2e)_{Project} = Emissions_{Baseline} - Emissions_{Project}$$

## Quantification of the project emissions

To determine the total emissions from the low CI electricity project for the compliance period, the following equation must be used:

$$Emissions_{Project}\ (tCO_2e) = \sum(Q_{P,i} \times CI_{P,i}) \times \frac{1\ tCO_2e}{1000000\ gCO_2e} \times 3.6 \frac{MJ}{kWh}$$

Where:

$Q_P$  = Measured quantity of electricity consumed at the Fossil Fuel Facility from a low CI electricity source (kWh)

$CI_P$  = Carbon intensity of the electricity consumed at the Fossil Fuel Facility from the low CI electricity source for the emission reduction project (gCO<sub>2</sub>e/MJ)

i = Each low CI electricity source of a given type at a given Low CI Electricity Site

## Quantification of the baseline emissions

To determine the total emissions from the baseline for the compliance period, the following equation must be used:

$$Emissions_{Baseline}\ (tCO_2e) = Q_{TP} \times CI_{Baseline} \times \frac{1\ tCO_2e}{1000000\ gCO_2e} \times 3.6 \frac{MJ}{kWh}$$

Where:

$Q_{TP}$  = Total measured quantity of low CI electricity consumed at the Fossil Fuel Facility (kWh)

$CI_{Baseline}$  = Carbon intensity of the baseline electricity consumed at the Fossil Fuel Facility as determined below (gCO<sub>2</sub>e/MJ)

**For existing facilities**, the carbon intensity of the baseline ( $CI_{baseline}$ ) is that of the electricity source being displaced with proof of electricity consumption of that source in 24-month period prior to project start date.

**For existing facilities with increased electricity consumption**, the carbon intensity of the baseline ( $CI_{baseline}$ ) is calculated by the following equation:

$$CI_{Baseline} = \frac{\sum (Q_B \times CI_B)}{Q_T}$$

Where:

$Q_T$  = Measured quantity of electricity consumed at the Fossil Fuel Facility excluding any amount of electricity used in electric vehicles for the 24 month period prior to the project start date (kWh)

$Q_B$  = Measured quantity of electricity consumed from each baseline electricity source (fossil fuel or network) for the 24 month prior to the project start date (kWh)

$CI_B$  = Carbon intensity of each individual baseline electricity source (fossil fuel or network) (gCO<sub>2e</sub>/MJ)

**For new facilities**, the carbon intensity of the baseline ( $CI_{baseline}$ ) is determined as follows:

- If the Fossil Fuel Facility is connected to the electrical network, use the appropriate regional electrical network CI or,
- If the Fossil Fuel Facility is not connected to the electrical network, use the natural gas simple cycle emission CI for the appropriate region.

# Monitoring Requirements

## Data Requirements

The following Table 1 provides monitoring, measurement, and quantification information that must be used to quantify the baseline and project emissions information. All requirements of the proposed Regulations apply, including the requirements set out in section 122 related to the monitoring plan.

Table 1 Data and Monitoring Requirements

Description	Unit	Measured / Prescribed	Method	Frequency	Additional Details	Application / Annual Credit Creation Report
<b>Baseline</b>						
Electricity consumed at the Fossil Fuel Facility (for each electricity source) ( $Q_B$ )  *For existing facilities only	kWh	Measured	Direct metering of electricity consumed.	Continuous metering for a 24-month operating period prior to project start date	Evidence of the source(s) of the baseline electricity that was consumed at the Fossil Fuel Facility during 24 months is required and provided on a monthly basis. Each source of electricity being used must be identified including the region of the electrical network from which it was sourced or the fossil fuel type.	Application
Carbon intensity for baseline electricity ( $CI_{Baseline}$ )	gCO <sub>2e</sub> / MJ	Prescribed or Calculated	Table 37 or 38: <i>Fuel LCA Model Methodology</i> , or  Calculated in <b>Quantification of the Baseline Emissions</b>	Annual	Required to use baseline electricity carbon intensities for that compliance period, that is either calculated or prescribed dependent on baseline scenario.	Application & Annual Report
Carbon intensity for individual type of baseline electricity ( $CI_B$ )	gCO <sub>2e</sub> / MJ	Prescribed	Table 37 or 38: <i>Fuel LCA Model Methodology</i>	Application and Annual	Required to use individual baseline electricity carbon intensities to calculate the baseline electricity CI through a weighted average in existing facility.	Application & Annual Report
Total electricity used on site from all low CI electricity sources ( $Q_{TP}$ )	kWh	Calculated	Sum of all $Q_P$ values measured in the project scenario	Annual	Refer to the section <b>Project Aggregation</b> of this quantification method.	Annual Report
<b>Project</b>						
Electricity used on site from a low CI electricity source ( $Q_P$ )	kWh	Measured	Direct metering of electricity consumed.	Continuous metering for the compliance period	Evidence that the Low CI Electricity Site commenced generation on or after July 1, 2017.	Annual Report
Carbon intensity for low CI electricity source ( $CI_P$ )	gCO <sub>2e</sub> / MJ	Prescribed	Table 38: <i>Fuel LCA Model Methodology</i>	Annual	Required to use electricity carbon intensities available for that compliance period.	Annual Report

# Reporting Requirements

## Application for Recognition of CO<sub>2</sub>e Emissions Reduction or Removal Project

1. Application in accordance with section 29 of the Regulations as listed in Schedule 4
2. Applicant, Owner and Operator Name and Contact Information of the Low CI Electricity Site(s) and Fossil Fuel Facility
  - a. Civic address or GPS coordinates
  - b. Mailing address
  - c. Name, telephone number and, if any, email address and fax number, of a contact person
3. Project Location of the Fossil Fuel Facility and each Low CI Electricity Site as described in the section **Project Locations** of this quantification method.
4. Evidence that the low CI electricity commenced generation and consumption at a Fossil Fuel Facility on or after July 1, 2017
5. Baseline Scenario Description
  - a. 24 months of evidence of the amount and source of electricity consumed at the Fossil Fuel Facility prior to the project start date, provided on a monthly basis
    - i. For any portion of electricity from the electrical network: the purchasing receipts for the 24-month period are required (on a monthly basis)
    - ii. For each fossil fuel sourced electricity produced on site: the technology description, fuel source, quantity of fuel, nameplate capacity of equipment, hours of operation, and electricity generated as measured by a meter for the 24-month period
  - b. For an existing facility: the amount of product(s) outputted from the Fossil Fuel Facility for a 24-month period prior to the project start date (provided on a monthly basis), and evidence of which electricity source was displaced by the low CI electricity (if there was no increase in product output and electricity consumption)
6. Project Scenario Description
  - a. Start date of the project including generation at Low CI Electricity Site and consumption at Fossil Fuel Facility
  - b. Project components (e.g., equipment, systems, processes, technologies)
  - c. Estimated Credit Creation
  - d. Indication of if electricity is supplied to multiple locations from the Low CI Electricity Site
  - e. For solar generated electricity
    - i. Capacity of electricity generator
    - ii. Type of equipment
    - iii. Make and model of the equipment
    - iv. Expected operating hours during a calendar year
    - v. Expected total electricity generated throughout a calendar year (kWh)
  - f. For wind generated electricity
    - i. Capacity of electricity generator
    - ii. Nominal wind
    - iii. Rotor diameter of the wind turbine
    - iv. Make and model of the equipment

- v. Expected operation hours during a calendar year
- vi. Expected total electricity generated throughout the compliance period (kWh)
- g. For any other type of low CI electricity
  - i. Capacity of electricity generator
  - ii. Make and model of the equipment
  - iii. Expected operating hours during a calendar year
  - iv. Expected total electricity generated throughout a calendar year (kWh)
- h. All inputs into project scenario and baseline condition listed in Table 1: Data and Monitoring Requirements.

## Annual Credit Creation Report

1. Report required as per section 103 of the Regulations with the requirements in Schedule 8
2. All inputs into project scenario and baseline condition listed in Table 1 : Data and Monitoring Requirements

# Record Keeping Requirements

Refer to sections 102 and 159 to 161 of the proposed Regulations and the Monitoring Plan referred to in section 122 and Schedule 19.

# Validation and Verification

For the validation of an Application or for the verification of a Report, referring to a CO<sub>2</sub>e Emission Reduction or Removal Project; in addition to the applicable requirements set out in sections 113 to 148 of the proposed Regulations, and to the specifications set out in the *Method for Validation, Verification and Certification – Clean Fuel Regulation*, the following requirements apply.

## Materiality Thresholds

### Quantitative materiality thresholds

The quantitative materiality thresholds to be applied while verifying the Credit Creation Report for a CO<sub>2</sub>e Emission Reduction or Removal Project, as per section 142, are as follows:

- a. Percent relative error that equals or exceeds 1% of the corrected number of credits or relative error that exceeds one credit, whichever is greater.

*Note: additional quantitative materiality thresholds are under development.*

### Qualitative materiality thresholds

The qualitative materiality thresholds to be applied in validating an Application for a CO<sub>2</sub>e Emission Reduction or Removal Project are set in subsection 145(2) of the proposed Regulations.

The qualitative materiality thresholds to be applied in verifying the Credit Creation Report for a CO<sub>2</sub>e Emission Reduction Project are set in paragraph 145(4)(a) of the proposed Regulation.

*Note: additional qualitative materiality thresholds are under development.*