



Renewable and Low Carbon Fuel Requirements Regulation Summary: 2010-2015

British Columbia’s Renewable and Low Carbon Fuel Requirements Regulation (Regulation) resulted in the avoidance of over 1.14 million tonnes of greenhouse gas emissions in 2015, and a total of 5.46 million tonnes between 2010 and 2015.

This Bulletin presents summary compliance data for the *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act* (Act) and the Regulation. The Act has two parts that are designed to avoid greenhouse gas emissions associated with the use of transportation fuels in B.C.: Part 2 sets requirements for renewable content; and Part 3 sets requirements for greenhouse gas emission intensity reductions.

The data that follows are based on supply data submitted to the Ministry by fuel suppliers as part of their compliance reporting obligations. This Bulletin incorporates updates to data from all compliance periods, and supersedes the values reported the previously published annual summaries for 2010, 2011 and 2012.

Part 2: Renewable Fuel Requirements

Part 2 of the Act requires fuel suppliers to include renewable content in the gasoline and diesel fuels supplied in B.C. for transportation or heating. Since 2010, fuel suppliers have been required to include five percent renewable content in the gasoline pool. In the diesel pool, the renewable requirement was three percent in 2010 and four percent thereafter. Companies who supply less than a total of 75 million litres of gasoline and diesel class fuels in a year are required to report gasoline and diesel fuel volumes, but are otherwise exempt from the requirements of the Regulation.

Table 1 shows that the fuel supply industry overall has maintained compliance with the Part 2 requirements since 2010.

Table 1 – Part 2 fuel volumes (million litres) and percentages for 2010-2015

	2010	2011	2012	2013	2014	2015
Total Gasoline	4,745.8	4,469.7	4,171.4	4,338.5	4,373.8	4,621.4
Non-exempt Gasoline	4,459.2	4,311.0	4,068.7	4,195.0	4,321.2	4,561.0
Exempt Gasoline	286.6	158.7	102.7	143.5	52.6	60.4
Renewable Gasoline	234.7	262.7	250.8	273.0	295.3	343.1
% Renewable Content	5.0%	5.7%	5.8%	6.1%	6.4%	7.0%
Total Diesel	3,310.7	3,663.0	3,583.8	3,571.1	3,650.9	3,440.4
Non-exempt Diesel	2,977.2	3,462.7	3,372.5	3,453.1	3,533.8	3,347.9
Exempt Diesel	333.5	200.3	211.4	117.9	117.1	92.6
HDRD^A and Biodiesel	91.7	152.9	158.7	203.0	219.8	222.8
% Renewable Content	3.0%	4.2%	4.5%	5.6%	5.9%	6.2%

A – Hydrogenation-Derived Renewable Diesel



Part 3: Low Carbon Fuel Requirements

Part 3 of the Act requires fuel suppliers to reduce the carbon intensity of the transportation fuel mix that they supply. Compliance is measured in terms of credits and debits, which represent the difference between the carbon intensity of the fuel and the current Part 3 (low carbon fuel) requirements for the relevant fuel class. The Ministry has established a schedule of reductions that will reduce the carbon intensity of the transportation fuel mix in B.C. by 10% by 2020 compared to 2010.

The fuel supply industry overall has maintained compliance with the Part 3 requirements since 2010.

Table 2 - Part 3 fuel quantities reported for 2010-2015

Fuel	Units (millions)	Fuel Class	2010	2011	2012 ^A	2013 ^B	2014 ^C	2015
Gasoline	L	Gasoline	4,459.2	4,311.0	4,068.7	4,195.0	4,321.2	4,561.0
Exempt Gasoline	L	Gasoline	286.6	158.7	102.7	143.5	52.6	60.4
Diesel	L	Diesel	2,977.2	3,462.7	3,372.5	3,453.1	3,533.8	3,437.9
Exempt Diesel	L	Diesel	333.5	200.3	211.4	117.9	117.1	92.6
Ethanol	L	Gasoline	234.7	262.7	250.8	273.0	295.3	343.1
Electricity	kWh	Gasoline	0.0	0.0	2.7	1.5	0.3	0.9
	kWh	Diesel	166.6	168.7	175.3	172.1	168.8	171.4
Biodiesel	L	Diesel	61.1	96.3	89.1	101.4	98.2	102.3
HDRD	L	Diesel	30.6	59.3	69.6	101.6	121.6	120.5
CNG	m ³	Gasoline	4.3	4.8	0.6	0.4	0.2	0.7
	m ³	Diesel	0.0	0.0	0.0	1.5 ^D	3.1 ^D	6.6 ^D
Propane	L	Gasoline	1.5 ^E	76.0	70.4	66.4	62.5	69.8
LNG	kg	Diesel	0.0	0.2	2.4	4.3	6.2	8.6
Hydrogen	kg	Diesel	0.2	0.3	0.3	0.2	0.1	0.0
	kg	Gasoline	0.0	0.0	0.0	0.0	0.0	0.0

A – Quantities represent 2/3 of the 18 month compliance period ending June 30, 2013

B – Quantities represent 1/3 of the values for the 18 month compliance period ending June 30, 2013 plus 1/3 of the values for the 18 month compliance period ending December 31, 2014

C – Quantities represent 2/3 of the 18 month compliance period ending December 31, 2014

D – The supply of diesel class CNG was likely under-reported from 2012 to 2015

E – The supply of propane was under-reported in 2010



Transportation Energy Use

Table 3 shows that total transportation energy use in B.C. increased from 2010 to 2015. However, an increasing proportion of this demand is being met by fuels with lower carbon intensity than the fossil fuels they replace.

Table 3 – Petajoules of Part 3 fuel supplied in 2010-2015 by fuel type

	2010	2011	2012 ^A	2013 ^B	2014 ^C	2015
Gasoline	164.6	155.1	144.7	150.5	151.7	160.3
Diesel	128.0	141.6	138.5	138.0	141.1	136.4
Ethanol	5.5	6.2	5.9	6.4	7.0	8.1
Electricity	0.6	0.6	0.6	0.6	0.6	0.6
Biodiesel	2.3	3.6	3.3	3.7	3.6	3.8
HDRD	1.1	2.2	2.5	3.7	4.4	4.4
CNG	0.2	0.2	0.0 ^D	0.1 ^D	0.1 ^D	0.3 ^D
Propane	0.0 ^E	1.9	2.4	2.0	1.6	1.8
LNG	0.0	0.0	0.1	0.2	0.3	0.5
Hydrogen	0.0	0.0	0.0	0.0	0.0	0.0
Total	302.3	311.3	297.6	305.1	310.5	316.1

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D – The supply of CNG was likely under-reported from 2012 to 2015

E – The supply of propane was under-reported in 2010



Carbon Intensity

Fuel producers may apply for a unique carbon intensity based on the specific operating parameters for the fuel they produce. Once the carbon intensity is approved, anyone who supplies that fuel must use the approved carbon intensity. For the current list of approved carbon intensities, see: [Approved Carbon Intensities \(RLCF-012\) \(PDF\)](#)

In order to encourage producers to apply for specific carbon intensities, the Regulation sets a precautionary high default carbon intensity for each fuel type recognized by the Regulation.

Table 4 - Weighted average carbon intensity (gCO₂e/MJ) of fuels reported for 2010 to 2015

	2010	2011	2012	2013	2014	2015
Ethanol	55.50 ^A	51.66 ^A	53.89 ^A	51.84 ^A	50.10	49.48
Electricity	11.94	11.94	11.94	11.48	11.00	11.00
Biodiesel	22.26 ^A	16.20 ^A	24.38 ^A	22.50 ^A	20.78	15.82
HDRD	48.04 ^A	40.30 ^A	45.42 ^A	31.51 ^A	23.55	17.02
CNG	59.74	59.74	59.74	61.74	62.14	62.14
Propane	78.29	78.29	78.29	68.10	69.02	68.08
LNG	-	66.54	66.54	64.18	63.26	63.26
Hydrogen	92.06	92.06	92.06	92.95	95.51	95.51

A – The calculation of average carbon intensity excluded fuels reported with default carbon intensity

Table 5 - Ethanol volume supplied (million litres) from 2010 to 2015 by carbon intensity range

	2010	2011	2012	2013	2014	2015
CI < 10	-	-	-	-	-	-
10 < CI < 20	-	-	-	-	-	16.8
20 < CI < 30	-	-	-	-	-	-
30 < CI < 40	15.1	27.6	-	6.5	12.9	2.6
40 < CI < 50	0.5	103.0	113.1	114.0	114.9	109.3
50 < CI < 60	132.1	76.7	94.3	120.1	155.0	175.1
60 < CI < 70	54.2	48.7	38.1	24.4	10.7	36.9
CI > 70	32.8	6.7	-	2.6	-	-

Note – Excludes fuels reported with default carbon intensity

Table 6 – Renewable content (Biodiesel + HDRD) volume supplied (million litres) from 2010 to 2015 by carbon intensity range

	2010	2011	2012	2013	2014	2015
CI < 10	-	6.7	-	9.2	18.4	12.1
10 < CI < 20	39.0	77.4	57.9	80.9	123.1	182.9
20 < CI < 30	3.3	34.9	25.1	31.2	45.6	16.9
30 < CI < 40	15.5	-	46.7	20.2	9.4	9.7
CI > 40	30.6	45.3	69.6	53.7	25.9	3.4

Note – Excludes fuels reported with default carbon intensity



Biofuel Feedstocks

As part of the approval process for the carbon intensity of a fuel, the producers are required to identify the feedstock being used to manufacture the fuel. This allows the Ministry of Energy and Mines to categorize and quantify the fuels that were supplied in each year by feedstock.

Table 7 – Renewable fuel volume by feedstock supplied from 2010 to 2015 (million litres)

	2010	2011	2012	2013	2014	2015
Barley & Wheat	-	-	-	6.4	12.8	0.2
Canola	42.0	74.2	43.6	60.1	76.5	91.6
Canola & Soybean	3.2	2.7	36.5	20.6	-	-
Canola & Tallow	-	3.4	-	-	-	-
Corn	66.5	108.2	86.8	181.5	276.2	287.1
Refined Palm Oil (RPO)	26.8	37.7	55.4	87.7	118.5	71.6
Palm (RPO) & Rapeseed	-	-	5.6	2.8	-	-
Soy	11.4	2.9	-	7.6	15.2	14.5
Tallow	-	16.9	7.0	3.5	-	0.3
Unknown	29.4	25.0	25.4	6.8	-	-
Wheat	25.2	27.6	-	6.8	13.6	55.2
Wheat & Corn	121.8	119.9	150.7	77.4	-	-
Yellow Grease (UCO)	-	-	-	1.5	3.1	46.6

Note – Excludes fuels reported with default carbon intensity

Lifecycle Greenhouse Gas Emissions Avoided

“Emissions avoided” means the avoided lifecycle emissions calculated according to the following formula, which is similar to the formula used for calculating credits and debits under the Act. Most fuels have lifecycle emissions that occur in several jurisdictions. The values below therefore include emission reductions that occur in British Columbia and elsewhere.

$$\text{Tonnes of CO}_2\text{e Avoided} = (\text{CI fossil fuel displaced} \times \text{EER fuel} - \text{CI of fuel}) \times \text{EC fuel} / 1,000,000$$

Where:

- CI fossil fuel displaced = the carbon intensity of the displaced fuel in that compliance period
- EER fuel = the prescribed energy effectiveness ratio of the low carbon fuel
- CI fuel = the carbon intensity of the low carbon fuel
- EC fuel = the energy content of the low carbon fuel calculated in accordance with the Regulation



Table 8 - Emissions avoided (tonnes CO₂e) by fuel

	2010	2011	2012 ^A	2013 ^B	2014 ^C	2015
Ethanol	92,107	235,617	219,375	237,650	258,980	303,754
Electricity	132,810	162,839	171,840	150,469	147,039	144,962
Biodiesel	176,249	315,824	295,387	245,464	264,007	293,823
HDRD	50,564	155,314	169,126	216,235	310,768	342,504
CNG	5,068	5,615	750 ^D	2,113 ^D	3,115 ^D	2,592 ^D
Propane	456 ^E	23,348	28,389	43,995	29,208	34,327
LNG	-	219	3,418	6,602	9,858	13,756
Hydrogen	1,861	3,816	4,152	1,932	963	16
Total	559,115	919,948	902,487	913,779	1,023,938	1,135,734

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The quantity of greenhouse gases avoided annually is expected to grow as suppliers continue to supply greater volumes of increasingly lower carbon fuels in order to achieve the scheduled carbon intensity reductions required by Part 3 of the Act.

If you have any questions regarding the Regulation, please contact the Low Carbon Fuel Branch at lcfr@gov.bc.ca.

For more information, visit www.gov.bc.ca/lowcarbonfuels.

The *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act* and the Renewable and Low Carbon Fuel Requirements Regulation can be found on the internet at: www.bclaws.ca.