



## Renewable and Low Carbon Fuel Requirements Regulation Summary: 2010-2019

British Columbia's Renewable and Low Carbon Fuel Requirements Regulation (Regulation) resulted in the avoidance of over 1.7 million tonnes of greenhouse gas emissions globally in 2019, and a total of 10.9 million tonnes between 2010 and 2019.

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

Data in this report is collected from supply data submitted to the Ministry of Energy, Mines and Low Carbon Innovation (Ministry) by fuel suppliers as part of their compliance reporting obligations. Information provided is subject to revisions as a result of improved reporting and compliance and verification activities. This report includes data for 2010 to 2019 that is current at the date of issue, however, 2019 data does not include significant quantities of electricity for electric vehicle charging or renewable gasoline and diesel from co-processing, and therefore should be treated as preliminary and subject to change. All previous versions of this report have been superseded.

### 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. 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. Between 2015 and 2020 companies who supplied less than a total of 75 million litres of gasoline and diesel class fuels in a year were required to report gasoline and diesel fuel volumes but were otherwise exempt from the requirements of the Regulation. The exemption threshold has been reduced to 25 million litres for the 2021 compliance period, and will be 200,000 litres in 2022 and subsequent compliance periods.



**Table 1 – Annual Part 2 fuel volumes (million litres) and percentages**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Total Gasoline</b>	4,741.1	4,469.9	4,284.6	4,343.3	4,514.9	4,623.3	4,861.6	4,851.9	4,723.9	4,780.7
<b>Non-exempt Gasoline</b>	4,459.2	4,311.0	4,079.1	4,199.7	4,320.4	4,500.5	4,717.6	4,777.5	4,638.5	4,600.9
<b>Exempt Gasoline</b>	281.9	159.0	205.5	143.6	194.6	122.8	144.0	74.4	85.4	179.8
<b>Ethanol</b>	234.7	262.7	250.8	274.9	299.0	342.9	375.1	376.0	370.4	334.6
<b>% Renewable Content</b>	5.0%	5.7%	5.8%	6.1%	6.5%	7.1%	7.4%	7.3%	7.4%	6.8%
<b>Total Diesel</b>	3,305.1	3,654.3	3,676.4	3,638.3	3,690.4	3,427.9	3,367.5	3,646.0	3,776.0	3,674.9
<b>Non-exempt Diesel</b>	2,977.2	3,459.2	3,530.8	3,521.2	3,511.7	3,310.0	3,239.8	3,544.2	3,665.6	3,404.5
<b>Exempt Diesel</b>	327.9	195.1	145.6	117.1	178.7	117.9	127.7	101.9	110.4	248.5
<b>HDRD<sup>A</sup> and Biodiesel</b>	91.7	155.6	158.7	192.6	226.6	222.7	177.3	213.0	230.2	328.6
<b>% Renewable Content</b>	3.0%	4.3%	4.3%	5.2%	6.1%	6.3%	5.2%	5.7%	5.9%	8.8%

A – Hydrogenation-Derived Renewable Diesel

Note: This report contains data for 2010-2019 that is current at the date of issue, but may include data not yet verified by Ministry staff. Information provided is subject to revisions as a result of compliance and verification activities or improved reporting. 2019 data does not include significant quantities of electricity for electric vehicle charging or renewable gasoline and diesel from co-processing and therefore should be treated as preliminary and subject to change.



### Part 3: Low Carbon Fuel Requirements

Part 3 of the Act requires fuel suppliers to reduce the lifecycle greenhouse gas emission intensity, also known as 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 Regulation establishes a schedule of reductions that will reduce the carbon intensity of the transportation fuel mix in B.C. by 20 percent by 2030 relative to 2010.

**Table 2 – Annual Part 3 fuel quantities reported**

	Units (millions)	Fuel Class	2010	2011	2012 <sup>A</sup>	2013 <sup>B</sup>	2014 <sup>C</sup>	2015	2016	2017	2018	2019
<b>Gasoline</b>	L	Gasoline	4,741.1	4,469.9	4,284.6	4,343.3	4,514.9	4,623.3	4,861.6	4,851.9	4,723.9	4,780.7
<b>Diesel</b>	L	Diesel	3,305.1	3,654.3	3,676.4	3,638.3	3,690.4	3,427.9	3,367.5	3,646.0	3,776.0	3,652.9
<b>Ethanol</b>	L	Gasoline	234.7	262.7	250.8	274.9	299.0	342.9	375.1	376.0	370.4	334.6
<b>Electricity</b>	kWh	Gasoline	-	-	-	0.1	0.3	0.9	1.3	1.7	46.8	1.1
	kWh	Diesel	166.6	168.7	178.1	173.4	168.8	171.4	170.8	193.2	194.5	204.0
<b>Biodiesel</b>	L	Diesel	61.1	96.3	89.1	95.1	101.1	102.2	104.0	107.3	115.6	113.8
<b>HDRD</b>	L	Diesel	30.6	59.3	69.6	97.5	125.5	120.5	73.3	105.8	114.6	214.8
<b>CNG</b>	m <sup>3</sup>	Gasoline	0.3 <sup>D</sup>	1.2	1.4	1.4	1.3	1.5	1.2	0.9	0.8	0.8
	m <sup>3</sup>	Diesel	- <sup>D</sup>	0.1 <sup>D</sup>	4.4	6.2	7.9	13.6	15.9	20.8	24.7	29.5
<b>Propane</b>	L	Gasoline	1.5 <sup>E</sup>	77.0	70.8	66.9	63.0	70.2	70.3	68.3	66.3	62.3
<b>LNG</b>	kg	Diesel	-	0.2	2.4	4.3	6.2	8.6	9.0	12.1	19.6	24.6
<b>Hydrogen</b>	kg	Diesel	0.2	0.3	0.3	0.2	0.1	-	-	-	9.0E-04	8.5E-04
	kg	Gasoline	-	-	-	8.3E-06	1.7E-05	1.2E-03	1.3E-03	1.2E-03	5.3E-04	1.7E-03

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 CNG was likely under-reported in 2010 and 2011

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 2019. However, an increasing proportion of this demand is being met by fuels with lower carbon intensities than the fossil fuels they replace.

**Table 3 – Annual energy in Petajoules supplied by Part 3 fuels**

	2010	2011	2012 <sup>A</sup>	2013 <sup>B</sup>	2014 <sup>C</sup>	2015	2016	2017	2018	2019
<b>Gasoline</b>	164.5	155.1	148.6	150.7	156.6	160.4	168.7	168.3	163.9	165.8
<b>Diesel</b>	127.7	141.2	142.1	140.6	142.6	132.5	130.2	140.9	145.9	141.2
<b>Ethanol</b>	5.5	6.2	5.9	6.5	7.1	8.1	8.8	8.9	8.7	7.9
<b>Electricity</b>	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.9	0.7
<b>Biodiesel</b>	2.3	3.6	3.3	3.5	3.7	3.8	3.8	3.8	4.1	4.0
<b>HDRD</b>	1.1	2.2	2.5	3.6	4.6	4.4	2.7	3.9	4.2	7.8
<b>CNG</b>	9.7E-03 <sup>D</sup>	5.0E-02 <sup>D</sup>	0.2	0.3	0.4	0.6	0.7	0.8	1.0	1.1
<b>Propane</b>	4.0E-02 <sup>E</sup>	2.0	1.8	1.7	1.6	1.8	1.8	1.7	1.7	1.6
<b>LNG</b>	-	8.2E-03	0.1	0.2	0.3	0.5	0.5	0.6	1.0	1.3
<b>Hydrogen</b>	2.1E-02	3.1E-02	3.4E-02	2.3E-02	1.2E-02	1.4E-04	1.6E-04	1.6E-04	2.0E-04	3.7E-04
<b>Total</b>	301.8	310.9	305.3	307.7	317.5	312.6	317.7	329.7	331.4	331.6

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 CNG was likely under-reported in 2010 and 2011

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 lifecycle parameters of the fuel they produce. Once the carbon intensity is approved, anyone who supplies that fuel must use the approved carbon intensity and corresponding B.C. low carbon fuel code. For the current list of approved carbon intensities and fuel codes, 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<sup>A</sup> – Annual weighted average carbon intensity (gCO<sub>2</sub>e/MJ) of fuels reported**

	2010	2011	2012	2013 <sup>B</sup>	2014	2015	2016	2017 <sup>B</sup>	2018	2019
<b>Ethanol</b>	55.51	51.66	53.11	51.27	49.74	49.47	41.00	32.48	30.43	29.18
<b>Electricity</b>	11.94	11.94	11.94	11.48	11.00	11.00	11.00	19.73	19.73	19.73
<b>Biodiesel</b>	15.23	16.20	21.84	21.06	20.37	16.07	15.37	6.49	2.48	-1.62
<b>HDRD</b>	48.04	40.30	45.42	32.11	24.72	16.37	16.40	20.08	20.27	17.87
<b>CNG</b>	59.74	59.74	59.74	61.21	62.14	62.14	62.14	63.64	63.64	62.38
<b>Propane</b>	78.29	78.29	78.29	73.66	68.46	68.17	68.02	67.97	67.84	67.11
<b>LNG</b>	-	66.54	66.54	64.18	63.26	63.26	63.26	63.08	63.04	64.70
<b>Hydrogen</b>	92.06	92.06	92.06	92.95	95.51	95.51	95.51	96.82	96.82	91.26

A – The calculation of average carbon intensity for Ethanol, Biodiesel and HDRD excludes the small volumes of biofuels reported with a default carbon intensity

B – Changes in carbon intensities occurred as a result of adopting newer versions of the lifecycle assessment model, GHGenius, on July 1, 2013 and January 1, 2017

**Table 5 – Annual supply of ethanol (million litres) by carbon intensity range**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>CI ≤ 10</b>	-	-	-	-	-	-	-	-	-	94.1
<b>10 &lt; CI ≤ 20</b>	-	-	-	0.9	1.8	17.2	64.3	105.0	124.1	2.9
<b>20 &lt; CI ≤ 30</b>	-	-	-	-	-	-	-	-	0.0	11.0
<b>30 &lt; CI ≤ 40</b>	15.1	27.6	-	6.5	12.9	2.4	93.0	219.6	211.2	196.9
<b>40 &lt; CI ≤ 50</b>	0.5	91.3	113.1	114.2	115.2	108.5	102.8	19.8	14.9	14.9
<b>50 &lt; CI ≤ 60</b>	132.1	88.4	94.3	125.8	157.2	177.5	108.2	31.3	20.1	14.7
<b>60 &lt; CI ≤ 70</b>	54.2	48.7	38.1	24.7	11.4	37.2	6.8	0.0	-	-
<b>CI &gt; 70</b>	-	3.3	-	-	-	-	-	-	-	-
<b>Default</b>	32.8	3.6	5.3	2.8	0.4	-	-	0.3	-	0.0



**Table 6 – Annual renewable content (Biodiesel + HDRD) volume supplied (million litres) by carbon intensity range**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
CI ≤ 0	-	-	-	-	-	-	1.7	10.0	35.0	47.2
0 < CI ≤ 10	-	-	-	9.3	18.6	11.1	25.3	87.9	97.6	146.4
10 < CI ≤ 20	39.0	75.8	40.4	81.3	122.2	182.8	118.5	76.6	56.9	65.7
20 < CI ≤ 30	6.6	25.7	16.7	31.6	46.5	19.2	30.7	35.4	39.4	63.9
30 < CI ≤ 40	-	-	29.3	19.3	9.4	9.7	1.2	0.4	1.3	5.4
40 < CI ≤ 50	30.6	42.4	64.0	41.8	19.6	-	-	-	-	-
50 < CI ≤ 60	-	-	5.6	6.0	6.4	-	-	-	-	-
CI > 60	-	2.9	-	1.9	3.7	-	-	2.7	-	-
Default	15.5	8.8	2.7	1.4	0.2	-	-	-	-	-

### 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 to quantify the fuels that were supplied in each year by feedstock.

**Table 7 – Annual renewable fuel volume by feedstock supplied (million litres)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Barley & Wheat	-	-	-	6.4	12.8	0.2	1.0	-	-	-
Canola	38.6	71.1	48.1	62.4	76.8	91.3	95.5	92.9	79.0	64.8
Canola & Soy	3.2	2.7	39.2	19.6	-	-	-	-	-	-
Canola & Tallow	-	3.4	-	-	-	-	-	-	-	-
Corn	66.5	106.0	92.4	181.6	270.7	287.0	269.2	235.8	237.2	190.2
Corn Oil	-	-	-	3.5	7.1	1.5	1.3	0.2	7.5	-
Corn & Wheat	121.8	115.9	157.8	78.9	-	-	-	-	-	-
Refined Palm Oil (RPO)	30.6	42.4	56.9	43.3	29.7	-	-	0.3	-	-
Palm (RPO) & Rapeseed	-	-	5.6	2.8	-	-	-	-	-	-
Palm Sludge Oil (PSO)	-	-	-	46.4	92.7	71.6	43.7	42.3	3.3	3.1
Pea Starch	-	-	-	-	-	-	-	-	-	0.1
Renewable Natural Gas	-	-	-	-	-	-	-	-	-	0.8
Soy	14.8	2.8	-	7.6	15.2	11.1	9.5	14.4	36.5	54.3
Spent Bleaching Earth Oil (SBE0)	-	-	-	-	-	-	-	34.6	27.6	33.8
Tallow	-	16.9	7.0	3.5	-	0.3	0.4	0.5	3.7	30.1
Unknown	25.6	29.6	2.5	1.6	0.6	-	-	0.3	-	0.0
Wheat	25.2	27.6	-	8.4	16.8	55.6	104.9	139.9	133.1	144.4
Yellow Grease (UCO)	-	-	-	1.6	3.2	46.8	26.9	27.9	72.5	142.5



## Lifecycle Greenhouse Gas Emissions Avoided

“Emissions avoided” for a given compliance period 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 prescribed for 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, using the prescribed energy densities

**Table 8<sup>A</sup> – Lifecycle emissions avoided (tonnes CO<sub>2</sub>e) by fuel**

	2010	2011	2012 <sup>B</sup>	2013 <sup>C</sup>	2014 <sup>D</sup>	2015	2016	2017	2018	2019
<b>Ethanol</b>	192,072	238,823	219,394	242,074	264,753	305,801	409,500	493,529	503,998	465,265
<b>Electricity</b>	144,008	145,830	153,891	150,487	147,083	149,946	149,934	165,981	212,467	174,598
<b>Biodiesel</b>	176,238	274,372	235,316	254,255	273,195	292,410	300,376	335,198	377,524	388,282
<b>HDRD</b>	50,564	114,878	121,702	218,554	315,406	339,641	206,529	288,400	311,712	602,947
<b>CNG</b>	294 <sup>E</sup>	1,496 <sup>F</sup>	5,740	6,837	7,934	12,910	14,521	17,856	20,939	26,396
<b>Propane</b>	478 <sup>F</sup>	23,480	21,611	25,986	30,361	34,347	34,676	35,062	34,306	33,371
<b>LNG</b>	-	219	3,418	6,638	9,858	13,814	14,428	20,168	32,529	38,863
<b>Hydrogen</b>	1,821	2,654	2,888	1,925	963	17	20	20	20	42
<b>Total</b>	565,475	801,753	763,958	906,756	1,049,553	1,148,885	1,129,983	1,356,215	1,493,496	1,729,763

A – The calculations in this table do not account for the difference in efficiency between compression ignition engines (i.e. diesel) and spark ignition engines (i.e. gasoline), and are therefore conservative estimates of emissions avoided for those fuels that were consumed in a compression ignition engine. Prior to July 1, 2013, compression ignition engines were prescribed an EER of 1.2 under the Regulation (relative to spark ignition engines).

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

C – 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

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

E – The supply of CNG was likely under-reported in 2010 and 2011

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



### Credit Market Scope

Under section 6 of the Act, Part 3 fuel suppliers generate credits by supplying a fuel with a carbon intensity below the prescribed carbon intensity limit and incur debits when supplying a fuel with a carbon intensity above the limit (e.g. petroleum-based gasoline and diesel). In addition, Part 3 fuel suppliers may also enter into Part 3 Agreements with the Director under the Act to take actions that would have a reasonable possibility of reducing GHG emissions through the use of Part 3 fuels sooner than would occur without the agreed-upon action. The table below shows the quantity of debits incurred and credits generated each year. All values are subject to adjustment as a result of compliance and verification activities.

Table 9 – Credit Market Scope

Compliance Period	Debits Incurred from Fuel Supply	Credits Generated from Fuel Supply	Credits Awarded from Part 3 Agreements	Surplus Credits/(Debits)
2013	161,091	513,389	-	352,298
2014	322,182	1,026,778	-	704,596
2015	639,704	1,102,006	66,380	528,682
2016	910,254	1,067,129	166,618	323,492
2017	1,379,343	1,258,560	97,833	(22,950)
2018	1,794,734	1,356,203	200,592	(237,939)
2019	2,122,628	1,540,189	231,774	(350,665)

The credits awarded from Part 3 Agreements are for the completion of project milestones during a given compliance period. For the 2013 and 2014 time periods, the quantities of debits and credits represent 1/3 and 2/3 respectively of the 18th month compliance period ending December 31, 2014.

### Need more information?

Please visit the Low Carbon Fuels website at [www.gov.bc.ca/lowcarbonfuels](http://www.gov.bc.ca/lowcarbonfuels) or email us at [lcfr@gov.bc.ca](mailto:lcfr@gov.bc.ca).

This information is for your convenience and guidance only and does not replace or constitute legal advice. It is recommended that parties who may be a Part 3 Fuel Supplier review the *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act* and the Renewable and Low Carbon Fuel Requirements Regulation and seek independent legal advice to confirm their status, legal obligations and opportunities. 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: <http://www.bclaws.ca>.