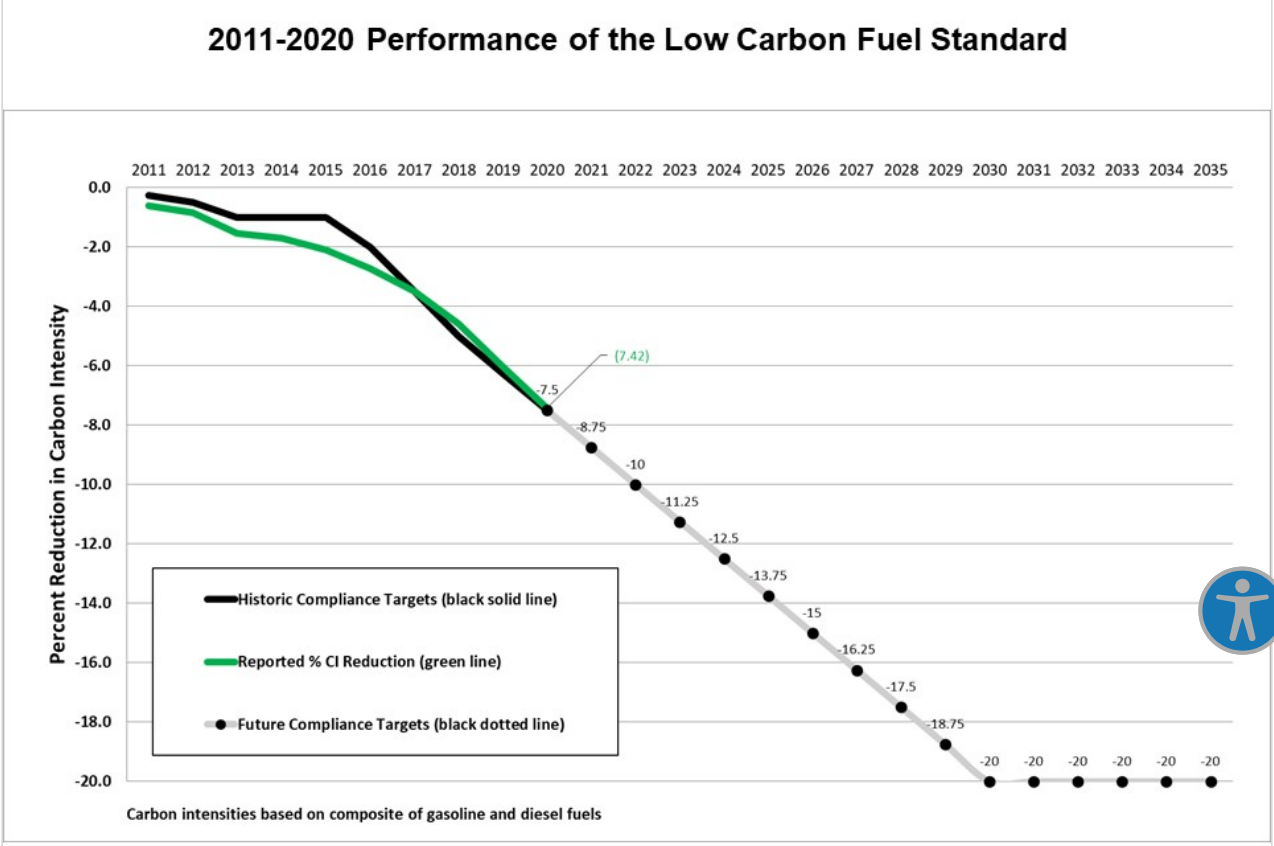
LCFS Data Dashboard

CATEGORIES

Programs Low Carbon Fuel Standard

Figure 1

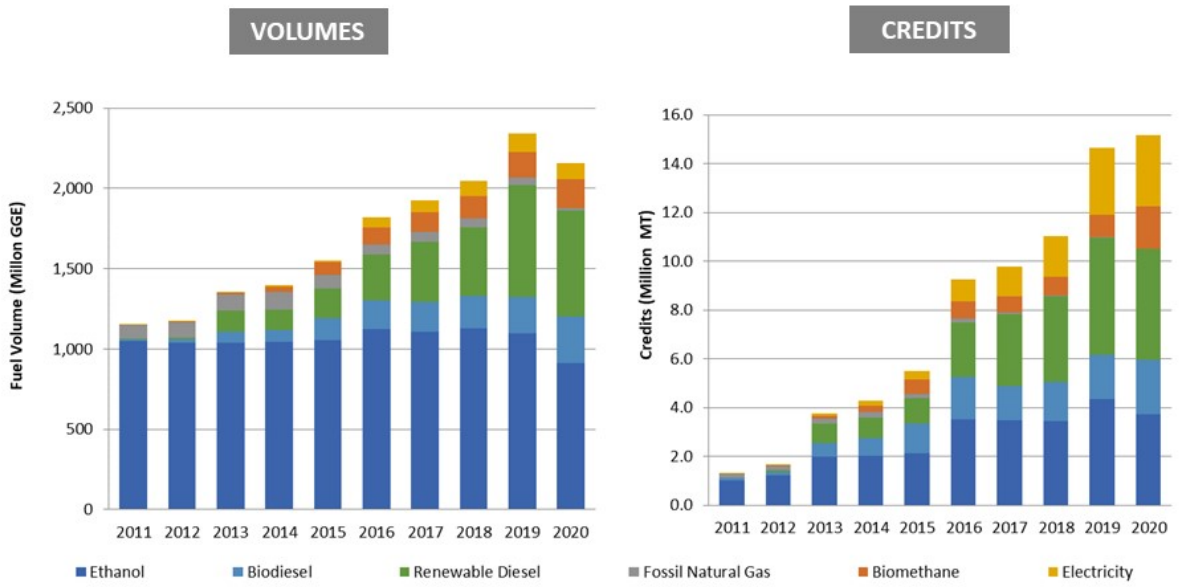


Last Updated 02/17/21

This figure shows the percent reduction in the carbon intensity (CI) of California's transportation fuel pool. The LCFS target is to achieve a 20% reduction by 2030 by setting a declining annual target, or compliance standard. The compliance standard was frozen at 1% reduction from 2013-2015 due to legal challenges. Years in which more alternative fuels were brought to market (green line) than needed to meet the compliance standard (black line) result in banked credits. Banked credits can be used in future years to meet the standard, such as in 2020. The program will continue post 2030 at a 20% reduction.

Figure 2

Alternative Fuel Volumes and Credit Generation



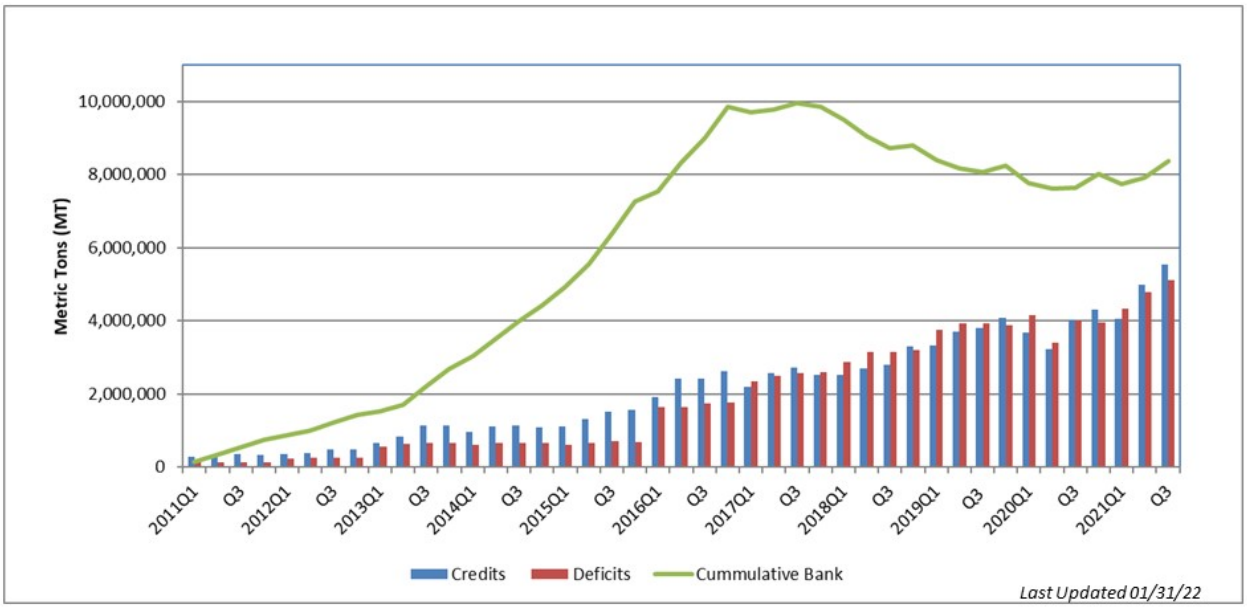
Last Updated 04/30/2021

The LCFS recognizes that the use of certain fuels results in greater greenhouse gas reductions than others; comparing volumes of each fuel and the total credits generated by that fuel reveals trends both in supply changes as well as the shifts in a fuel's source or innovation in its production. For instance, while ethanol makes up the largest amount of alternative fuel on a volume and energy basis, in 2020 about seventy five percent of the LCFS credits were generated by non-ethanol fuels with lower carbon intensities. All other fuel types reported to the LRT-CBTS make up less than 1% of the total volume and credits and are not visually represented.

Click to download the Excel spreadsheet of this graph.

Figure 3

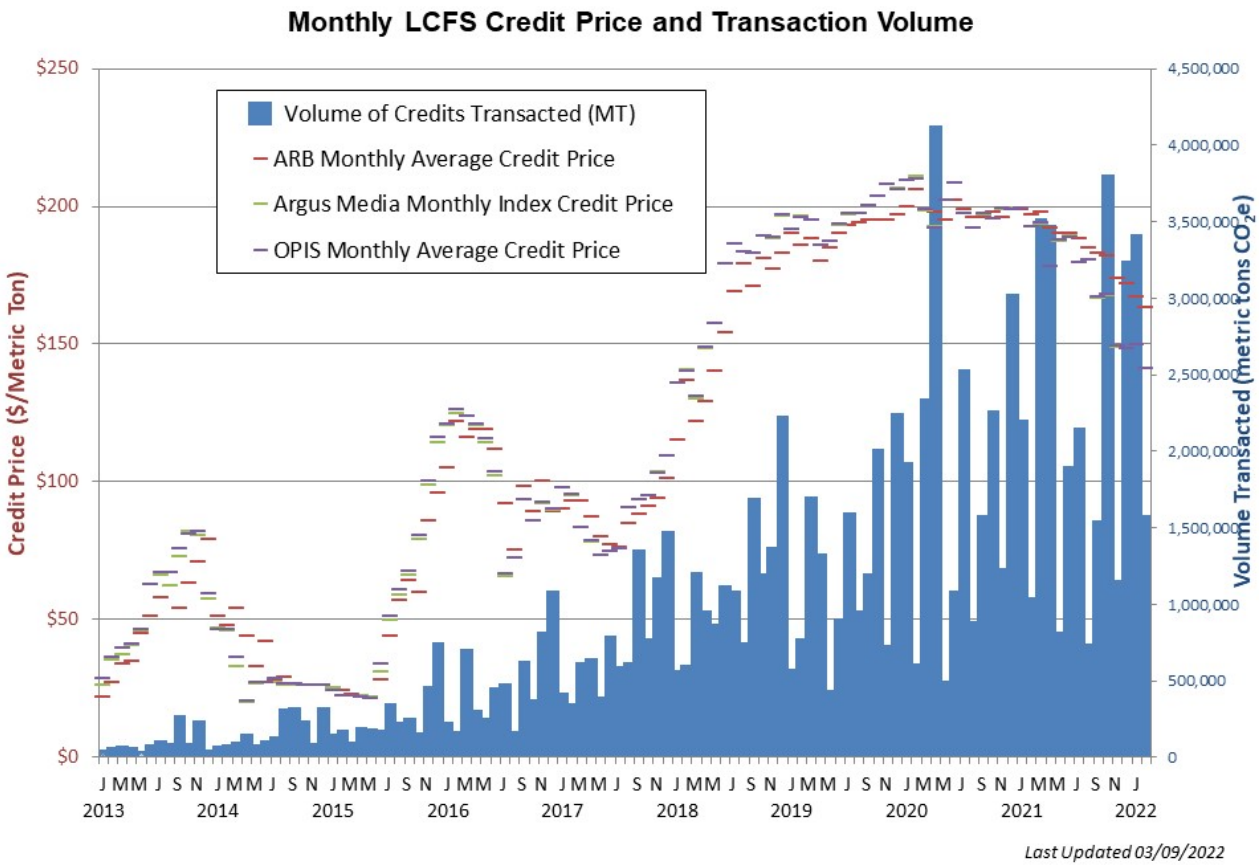
Total Credits and Deficits for All Fuels Reported and Cumulative Credit Bank
Q1 2011 – Q3 2021



This chart shows the total deficits (in red) and credits (blue) generated during each quarter. The green line tracks the total number of banked credits.

Regulated entities have consistently over-complied with the standard, generating a bank of credits which can be sold or retired to meet compliance obligations at any time. At the end of Q3 2021, the bank stood at nearly 8.4 million credits. No 2019 Low Complexity/Low Energy Use Refining credits have been included as of this publication. As the standard becomes more stringent in order to reach the targeted reductions by 2030, regulated entities can rely on these banked credits to ease compliance.

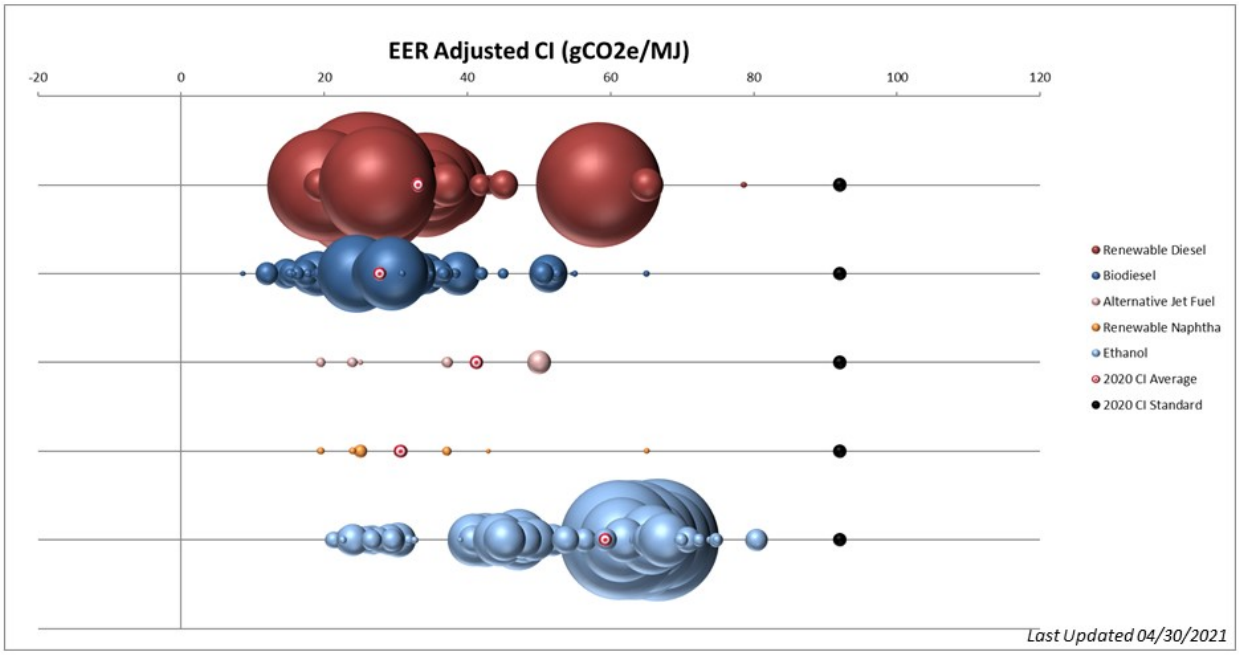
Figure 4



This chart tracks credit prices and transaction volumes over time. Monthly average credit prices reported by Argus Media and OPIS [used with permission] are shown along with CARB monthly average price.

Figure 5a

2020 Volume-weighted Average Carbon Intensity by Fuel Type for Liquid Fuels

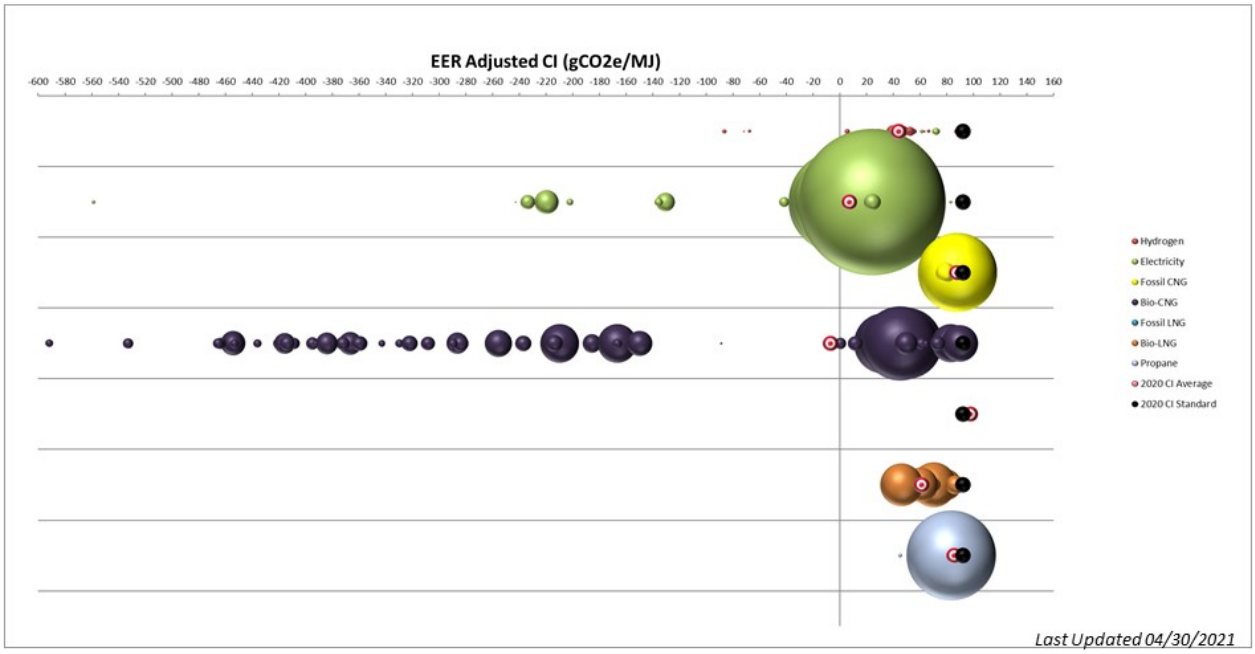


This figure provides perspective on the performance of actual quantities of fuel consumed in California. Each sphere represents a certified fuel pathway; the size of the sphere represents the reported volume of the fuel in 2020, while its position on the horizontal axis indicates the carbon intensity of that fuel.

The alternative fuel's CI value is divided by its Energy Economy Ratio (EER) in order to obtain the EER-adjusted CI value, representing the emissions which occur from the alternative fuel per MJ of conventional fuel displaced.

Figure 5b

2020 Volume-weighted Average Carbon Intensity by Fuel Type for Non-Liquid Fuels

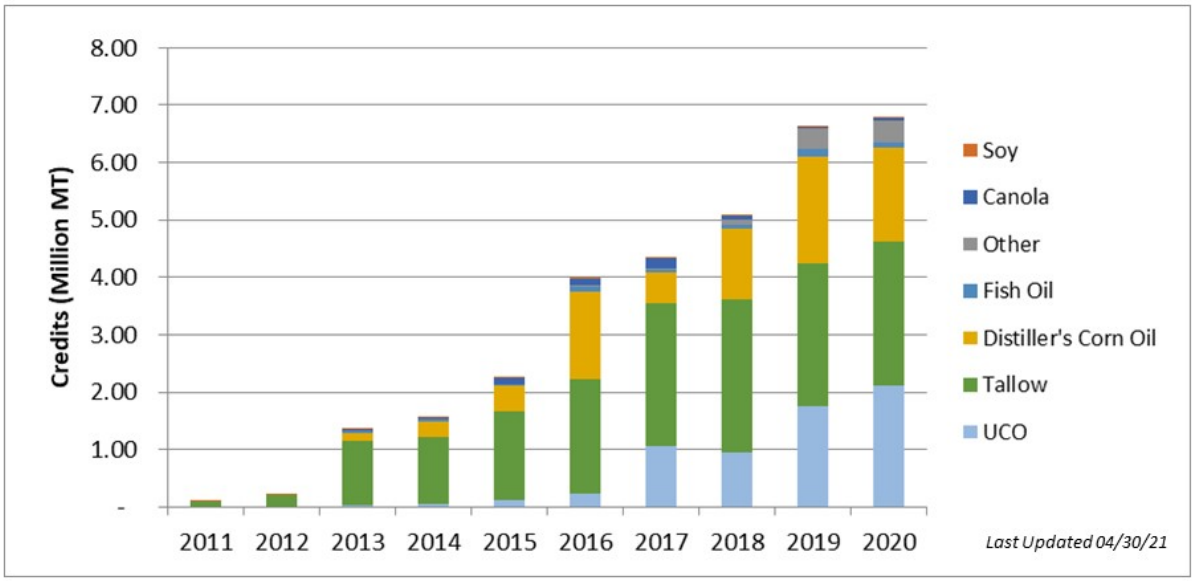


This figure provides perspective on the performance of actual quantities of fuel consumed in California.
Each sphere represents a certified fuel pathway; the size of the sphere represents the reported volume of the fuel in 2020, while its position on the horizontal axis indicates the carbon intensity of that fuel.

The alternative fuel's CI value is divided by its Energy Economy Ratio (EER) in order to obtain the EER-adjusted CI value, representing the emissions which occur from the alternative fuel per MJ of conventional fuel displaced.

Figure 6

Crops and Residues used in Biomass-based Diesel Production
Q1 2011 – Q4 2020



The LCFS incentivizes growth in fuels derived from non-land based sources. In 2020, 93% of total credits generated by biodiesel and renewable diesel fuels were derived from wastes or residues rather than conventional crop-based fuel credit generation. One LCFS credit is equal to 1 metric ton CO_2-equivalent ($MTCO_2e$), as determined on a life-cycle basis which takes into account the emissions during raw material extraction or recovery, feedstock cultivation, fuel production, transport, processing and use of the fuel. The feedstocks used to produce California's low-CI biomass-based diesel fuels include industrial by-products such as used cooking oil (UCO), tallow, corn oil extracted from distiller grains and solubles (DGS), and oils from fish processing.

Click to download the Excel spreadsheet of this graph.

Figure 7

Credit Value Calculator:
Estimated LCFS Premium at Sample LCFS Credit Prices

Alternative Fuel Premiums at Sample LCFS Credit Prices
($/gal gasoline-equivalent for fuels used as gasoline substitutes)

CI Score (gCO2e/MJ)	Credit Price $196	$80	$100	$120	$160	$200
-273	$8.31	$3.39	$4.24	$5.09	$6.79	$8.48
10	$1.89	$0.77	$0.96	$1.16	$1.54	$1.93
20	$1.66	$0.68	$0.85	$1.02	$1.36	$1.70
30	$1.44	$0.59	$0.73	$0.88	$1.17	$1.46
40	$1.21	$0.49	$0.62	$0.74	$0.99	$1.23
50	$0.98	$0.40	$0.50	$0.60	$0.80	$1.00
60	$0.75	$0.31	$0.38	$0.46	$0.62	$0.77
70	$0.53	$0.22	$0.27	$0.32	$0.43	$0.54
80	$0.30	$0.12	$0.15	$0.18	$0.25	$0.31
90	$0.07	$0.03	$0.04	$0.04	$0.06	$0.07
100	-$0.15	-$0.06	-$0.08	-$0.09	-$0.13	-$0.16
110	-$0.38	-$0.16	-$0.19	-$0.23	-$0.31	-$0.39
120	-$0.61	-$0.25	-$0.31	-$0.37	-$0.50	-$0.62
130	-$0.83	-$0.34	-$0.43	-$0.51	-$0.68	-$0.85
140	-$1.06	-$0.43	-$0.54	-$0.65	-$0.87	-$1.08
150	-$1.29	-$0.53	-$0.66	-$0.79	-$1.05	-$1.32
CaRFG* ($/gallon) 100.82	-$0.139	-$0.057	-$0.071	-$0.085	-$0.113	-$0.142

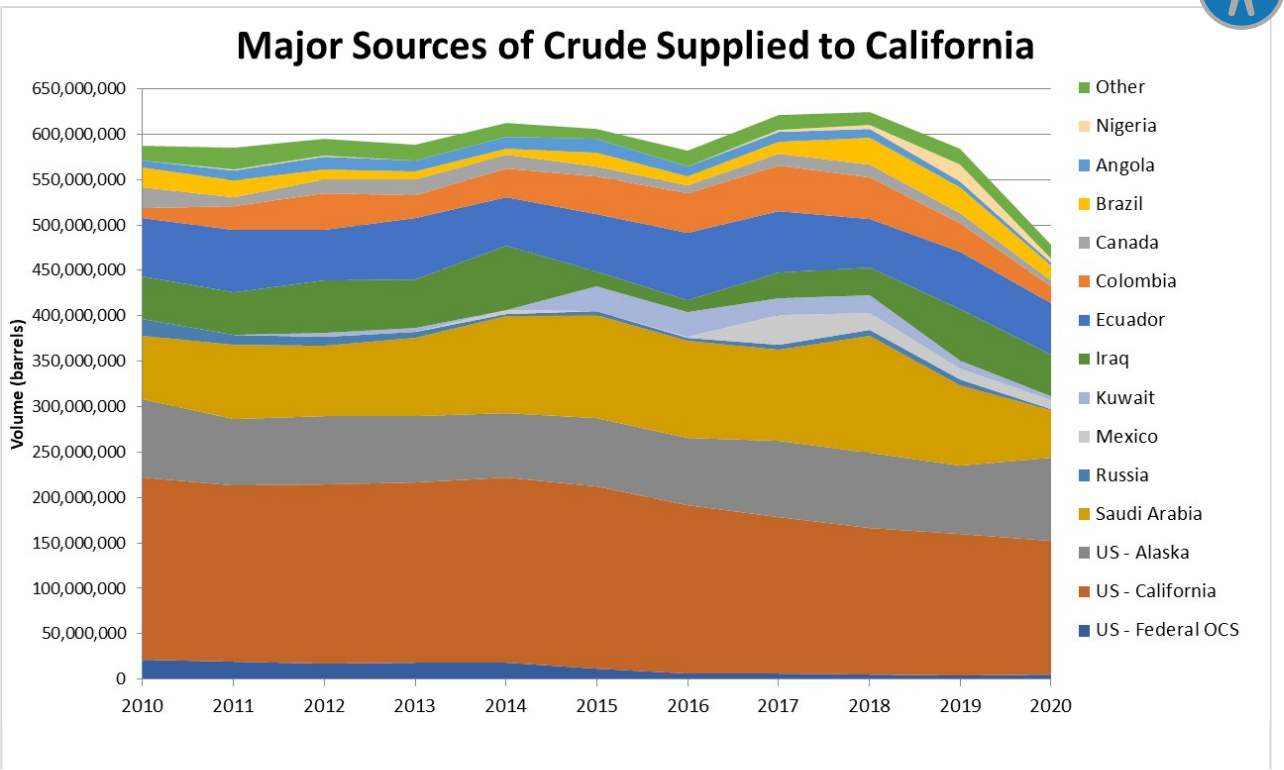
* Maximum pass-through cost for gasoline. Assumes a blend of CARBOB with 10 volume percent ethanol at a CI of 79.9 g/MJ. Ethanol at 79.9 g/MJ is assumed to receive no LCFS premium.

Last Modified 05/31/2019

The value of a bundled credit is shown per gallon-equivalent as revenue for alternative fuel producers at a range of sample CI values and credit prices. Using the calculator, the credit value of any fuel can be determined; for example, at Q4 2018 credit prices of approximately $196/MT, a renewable diesel fuel with a CI score of 30 gCO_2e/MJ generates LCFS credits worth $1.69 per diesel-gallon equivalent (DGE). Each kilowatt-hour of grid electricity used in an electric vehicle will earn an additional $0.17 ($5.35 per gasoline-gallon equivalent GGE) through the LCFS credits generated.

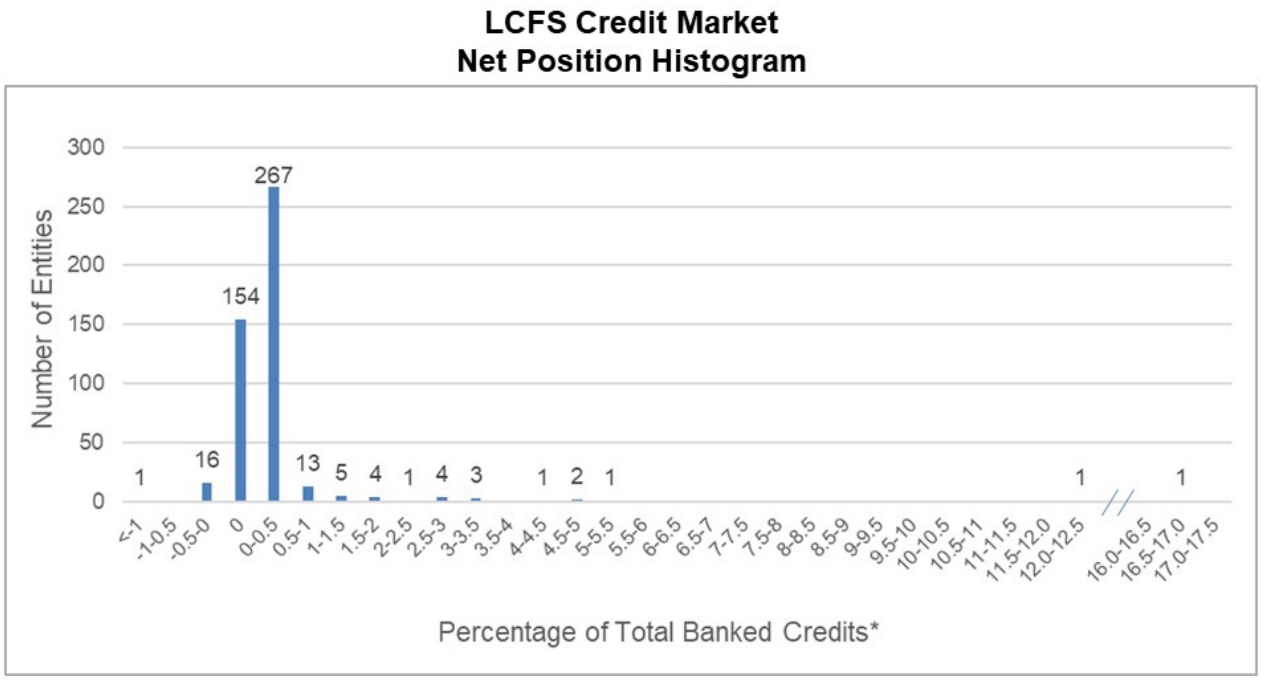
Click to download Excel spreadsheet version of this customizable table. Select the year, Energy Economy Ratio (EER), and enter any Carbon Intensity (CI) and LCFS market price to calculate the premium for any fuel of interest.

Figure 8



This figure depicts the major sources of crude oil supplied to California Refineries from 2010 to 2020. Crude oil from California, Alaska, and 11 countries account for over 95 percent of the volume supplied to California in any given year.

Figure 9

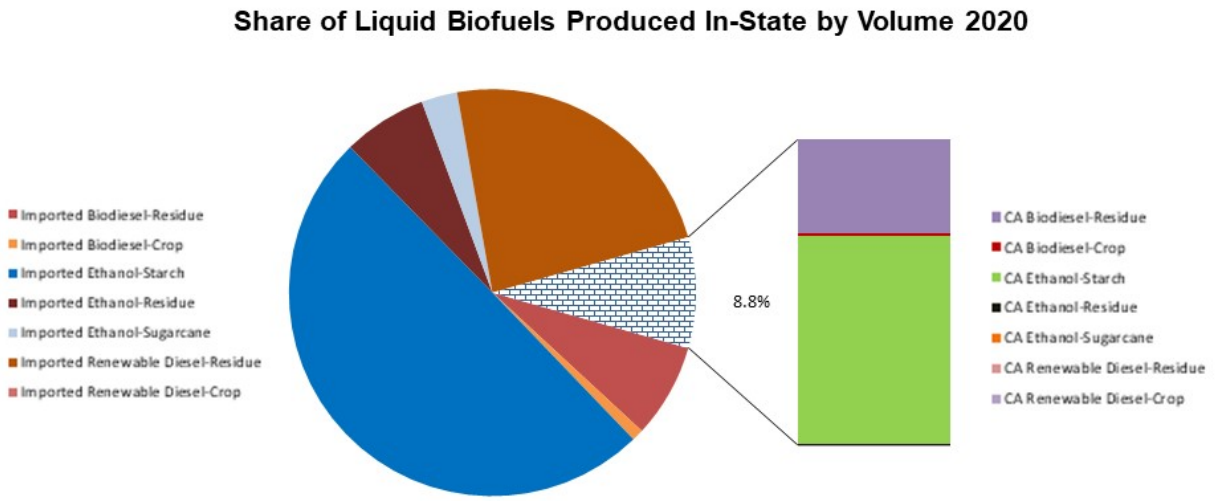


Last Updated 01/31/22

This frequency plot indicates the number of entities that hold a given percent stake in the overall LCFS credit bank as of the last compliance period. The horizontal axis indicates the percentage of the total bank of credits, while the vertical axis shows the number of entities holding a given credit position. As of Q3 2021, 95% of participating entities hold less than 1% of credits each.

*This represents the percent of the total available credits (that could be used in the future to demonstrate compliance) that is held by a regulated party. Each position is calculated by looking at the total number of credits currently banked across all parties and dividing each party's current credit bank by the total credit bank.

Figure 10



Last Updated 04/30/21

Year	2011	2012	2013	2014	2015
Share of Total Reported Liquid Biofuel Volume that was Produced in State	11.00%	12.46%	11.81%	14.61%	13.11%
Total Instate Volumes (GGE)	120,255,488	137,919,350	141,779,135	176,105,168	180,521,451
	2016	2017	2018	2019	2020
	13.15%	13.59%	13.50%	11.98%	8.80%
	210,600,765	229,035,384	236,297,969	209,471,652	123,026,955

The Low Carbon Fuel Standard attracts the cleanest fuels from around the world to California. In-State production capacity has kept up with growing biofuel consumption – the share remains relatively flat as both in-state production and total supply of liquid biofuels increase proportionally.

Figure 11 (updated in November 2020) - Underlying Data Table (Credit value is assume be $192 based on 2019 annual average credit trading value)

(800) 242-4450 | helpline@arb.ca.gov
1001 I Street, Sacramento, CA 95814
P.O. Box 2815, Sacramento, CA 95812