

How Earned Low Carbon Fuel Standard (LCFS) Credits Change From Year to Year

This summary responds to questions from the Advanced Clean Transit Workgroup about how the amount of LCFS credits change between 2016 through 2020 and beyond. Transit Agency revenues from LCFS credit sales will be included in the total cost of ownership analysis for the Advanced Clean Transit program.

The LCFS is a regulation designed to reduce greenhouse gas (GHG) emissions associated with the lifecycle of transportation fuels used in California. A transit agency that opts into the LCFS program may generate credits¹ through operating battery electric buses or fixed guideway systems², dispensing fossil compressed natural gas (CNG), or providing hydrogen. Transit agencies can also generate credits for renewable natural gas and other alternative fuels if the fuel producer or other party with the first right to generate credits passes on the right to the transit agency by written contract. The credits can be sold to regulated parties in the LCFS credit market to reduce operating costs for transit fleets.

The amount of LCFS credits that are generated varies by fuel type, pathway and compliance target. The compliance target declines to achieve a 10% reduction from the 2010 baseline through 2020 and beyond. The amount of credits that can be generated for a given fuel pathway is determined by how much its carbon intensity (CI) is below the compliance target for the year. As the compliance target declines through 2020, the amount of credits that can be generated for a fuel at a given CI will also decline. It is expected that, as alternative fuel production continues to expand and innovations occur, these CIs will improve over time resulting in higher credit generation potential.

A credit value calculator³ is available to determine how many credits can be earned each year from 2016 to 2020. The calculator uses input variables (including calendar year, Energy Economy Ratio (EER) for the vehicle type, CI of the fuel used, and credit price) to determine the potential revenue generated by a given fuel pathway in a compliance year. Table 1 provides examples of the CI of different fuel pathways to show how the credit value would change as the regulation becomes more stringent and the CI target declines. In this example, the credit price remains constant at \$100/MTCO₂e and the CIs of the fuel pathways do not change over time. The actual credit price will fluctuate with market conditions and improvements in CIs may occur over time.

The CI of electricity is expected to decline because the Renewable Portfolio Standard requires 33 percent renewable generation in California by 2020 and 50 percent by 2030. The estimated credit revenue for electricity in 2020 would be greater than \$0.10/kWh at \$100/MTCO₂e. Existing statute (Senate Bill 1505) requires that all hydrogen dispensed as a transportation fuel at State funded stations must be made from 33 percent renewable energy. The CI scores shown here are representative examples of each fuel type and are held constant for the sake of illustration. In reality, the CIs vary with individual pathways and are likely to change as alternative fuel production continues to improve.

¹ As described in LCFS Regulatory Guidance 16-07 available at www.arb.ca.gov/fuels/lcfs/guidance/regguidance_16-07.pdf

² Fixed Guideway System means a system of public transit electric vehicles that can operate only on its own guideway (directly operated, or DO) constructed specifically for that purpose, such as light rail, heavy rail, cable car, street car, and trolley bus.

³ Available at www.arb.ca.gov/fuels/lcfs/dashboard/creditpricecalculator.xlsx

Table 1. LCFS credit revenue for selected fuels in 2016 and in 2020^a at credit price \$100/MT

	Representative Carbon Intensity ^b (CI) (gCO ₂ e/MJ)	EER for transit buses	LCFS Credit Revenue in 2016	LCFS Credit Revenue in 2020
Fossil diesel	102	1	- \$0.02/DGE	- \$0.12/DGE
Renewable diesel	50	1	\$0.67/DGE	\$0.56/DGE
Fossil CNG	78	0.9	\$0.16/DGE	\$0.06/DGE
Renewable CNG	25	0.9	\$0.87/DGE	\$0.77/DGE
Electricity (Grid)	105	4.2	\$0.11/kWh	\$0.10/kWh
Electricity (Solar)	0	4.2	\$0.15/kWh	\$0.14/kWh
33% Renewable Hydrogen ^c	88	1.9	\$1.22/kg	\$1.03/kg
100% Renewable Hydrogen ^d	0	1.9	\$2.28/kg	\$2.09/kg

a: The revenues shown for 2020 assume no improvement in carbon intensities.

b: Certified CI values can be found at <http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf> (Table 6 on p. 66) and at <http://www.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm>

c: Hydrogen made by reforming a mixture of natural gas with 33% biomethane.

d: A certified pathway for hydrogen produced by electrolysis using solar PV power.

The change in LCFS credits is relatively small for most advanced fuels especially compared to possible changes in LCFS credit prices or advances in CI. For conventional diesel and fossil CNG, the change in LCFS credit value is more significant.