



Regulatory Guidance

May 2016



Low Carbon Fuel Standard Regulatory Guidance 16-05

LCFS Hydrogen Programs FAQs

What is the LCFS regulation, and who is subject to it?

The Low Carbon Fuel Standard (LCFS)¹ is a regulation designed to reduce Greenhouse Gas (GHG) emissions associated with the lifecycle of transportation fuels used in California. The lifecycle of a fuel includes the emissions associated with producing, transporting, distributing and using the fuel. The regulation reduces lifecycle GHG emissions by assessing a “Carbon Intensity” (CI) score to each transportation fuel based on its lifecycle assessment.

Air Resources Board adopted the LCFS regulation in 2009 to reduce the carbon intensity of transportation fuels used in California by at least 10 percent by 2020 from a 2010 baseline. In 2011, the Board passed amendments to the LCFS. On September 25, 2015, the Board approved the re-adoption of the LCFS.

Each fuel provider is required to ensure that the overall CI score for its fuel pool meets the annual CI target for a given year. A fuel that has a CI that is below the target in a given compliance period generates credits. Conversely, a fuel with a CI above the target will generate a deficit. The regulation applies primarily to producers and importers of finished fuels, as well as fuel blendstocks and substitutes. Fuels subject to the LCFS requirements include gasoline, diesel fuel, and their substitutes and blendstocks.

The LCFS specifically exempts a number of lower-carbon fuels, such as electricity and hydrogen, because they meet the CI targets through 2020. Providers of these fuels, if they choose not to participate in the LCFS program, have no obligations for these fuels under LCFS. However, the LCFS allows these fuel providers to “opt-in” to the program, and generate LCFS credits that they can sell and trade in the California LCFS market. Opting in is a voluntary decision, and it is accomplished simply by registering in the LCFS Reporting Tool (LRT) as a credit generator.

¹ <http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf>

Why should I opt into the LCFS program?

By opting into the LCFS program and providing hydrogen as transportation fuel, the hydrogen providers can earn an LCFS credit for each metric ton of CO₂ equivalent (MTCO_{2e}) emissions avoided through the use of hydrogen – a transportation fuel with much lower CI than the 2020 standard specified in the LCFS regulation. The credits will have a monetary value and may be sold to regulated parties who must offset deficits created by their supply of fuels with CIs that exceed the LCFS standards.

Who can opt into the LCFS program under the hydrogen provisions?

For hydrogen used as a transportation fuel, the entities that are eligible to generate LCFS credits are:

- the entity who owns the finished hydrogen fuel at the time the finished fuel is created
- the entity who acquires ownership of finished hydrogen fuel, if the transferor and recipient agree by written contract that the entity acquiring ownership is eligible to generate credits
- hydrogen fuel cell forklifts fleet owner

How do I opt into the LCFS program?

Opting into the LCFS program involves registering with ARB in the LCFS Reporting and Credit Bank & Transfer System (LRT-CBTS), and establishing an account. This process is simple and primarily includes providing the organization name, organization address, organization federal employer identification number, primary contact name, telephone number, and email address.

For more information about opting into the program and registering an organization in the LRT system, please visit (LRT-CBTS) (www.arb.ca.gov/lcfsrt).

Are there any requirements/obligations after I opt-in to the LCFS program?

Hydrogen providers that opted into the LCFS program are subject to the reporting requirements set forth in Section 95491(a), and the recordkeeping requirements set forth in section 95491(b) through (e) of the LCFS regulation.

After opting in, the hydrogen provider must submit quarterly and annual reports. The data for the quarterly reports must be initially uploaded to the LRT-CBTS within the first 45 days after the end of each quarter. The uploaded draft reports can be revised and edited. Final quarterly reports must be submitted in the LRT-CBTS by the deadlines shown below:

- June 30th – for the first calendar quarter covering January through March;
- September 30th – for the second calendar quarter covering April through June;
- December 31st – for the third calendar quarter covering July through September;
and
- March 31st – for the fourth calendar quarter covering October through December.

An annual compliance report for the prior calendar year must be submitted in the LRT-CBTS by April 30th of each year.

The primary parameter reported are the amount of fuels (in kg for hydrogen) dispensed per compliance period to motor vehicles for transportation use. It is important to note that even if no fuel was produced and no transactions were made, a quarterly report with zero amounts must be submitted to remain in good standing in the system.

After opting in, when can I start generating credits?

Opting into the LCFS program becomes effective when the hydrogen provider establishes an account in the LRT-CBTS. The opt-in credit generator may not report and generate credits based on transactions that precede the quarter in which they opted in. For instance, if you opt-in to the LCFS on June 30th, you can generate credits for the 2nd calendar quarter covering April through June, but not the 1st quarter of that calendar year.

What revenues can my hydrogen fuel cell vehicles generate?

The LCFS credits can be calculated by the following equation:

$$Credits = \left(CI_{standard} - \frac{CI_{Hydrogen}}{EER} \right) \times Energy\ Density \times EER \times Hydrogen\ (in\ kg) \times 10^{-6}$$

The Energy Economy Ratio (EER) is a dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel (see Table 1); the 2016 CI Standard is 96.50 gCO₂e/MJ for gasoline substitute, and 99.97 gCO₂e/MJ for diesel substitute; the CI of hydrogen is 113.38 gCO₂e/MJ²; the Energy Density of hydrogen is 120 MJ/kg.

The estimated LCFS credit revenues per kg of hydrogen fuel used in typical hydrogen fuel cell vehicles (FCVs) are shown in Table 1 below.

² Assume hydrogen is produced using compressed H₂ from central reforming of NG (no liquefaction and re-gasification steps).

Table 1: Estimated 2016 credit revenue generated

Typical EV Types	EERs	Credit Revenues (per kg)		
		LCFS Credit Price		
		\$50*	\$100*	\$150*
Light/Medium FCV**	2.5	\$0.77	\$1.53	\$2.30
Heavy Duty FCV***	1.9	\$0.46	\$0.92	\$1.38

* Credit prices used here are for illustration purposes only.

** Electricity is used as a gasoline substitute

*** Electricity is used as a diesel substitute

Is there an expiration date for LCFS credits?

No, there is no expiration date for the LCFS credits. You can hold/bank the credits for any period of time.

Contact:

If you have questions regarding the above information, please contact Manisha Singh at (916) 327-1501 or Manisha.singh@arb.ca.gov for general questions related to LCFS, and Jing Yuan at (916) 322-8875 or jyuan@arb.ca.gov for questions related to LCFS Hydrogen Program.