



The Sol Standard:

Key Insights into LCFS and
Clean Fuels Markets

August 2022

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California LCFS Price Trends

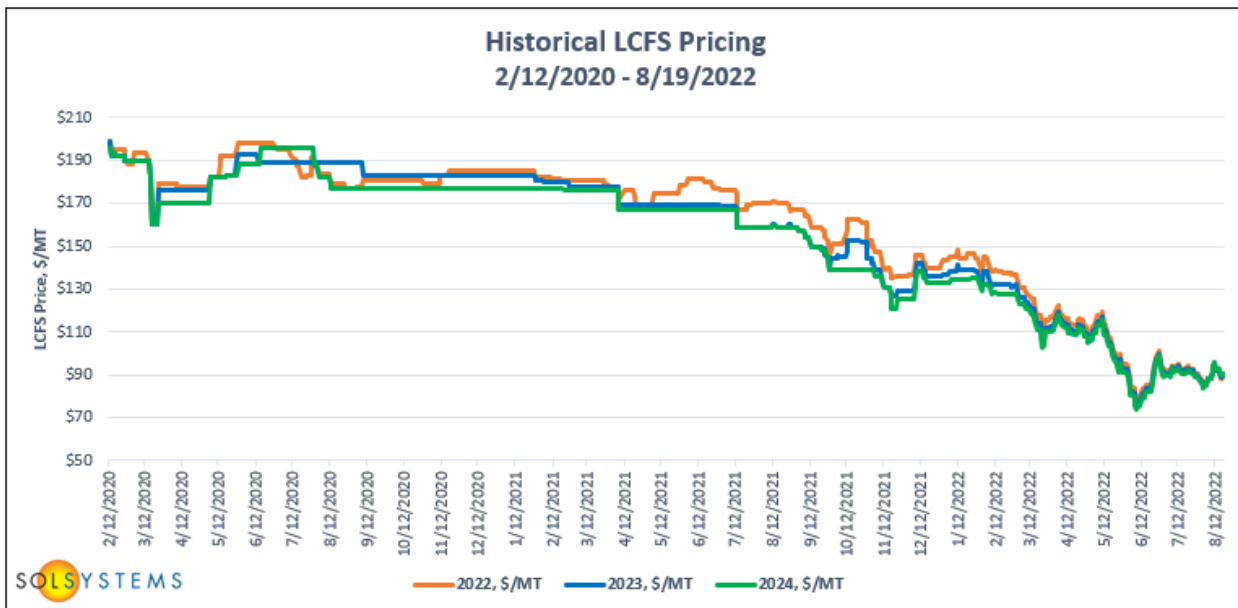
Pricing in the California Low Carbon Fuel Standard (“LCFS”) continues in double digits with current spot prices in the \$80-90/credit range for immediate delivery. This is a 48 percent decrease from spot pricing at this time last year, a 39 percent decrease from the beginning of the year, and a 5 percent decrease from the end of last quarter.

Similar to past quarters when the California Air Resources Board (“CARB”) held stakeholder convenings, the market did see a slight uptick on pricing following CARB’s July 7, 2022 and August 18, 2022 meetings. However, by and large, pricing has held steadily below \$90 over the summer months. With the level of oversupply currently in the market and the amount of new credits expected to come in from the rapidly growing renewable diesel, renewable natural gas (“RNG”), and electricity pathways, pressure on pricing will remain until a program or policy intervention from CARB takes place.

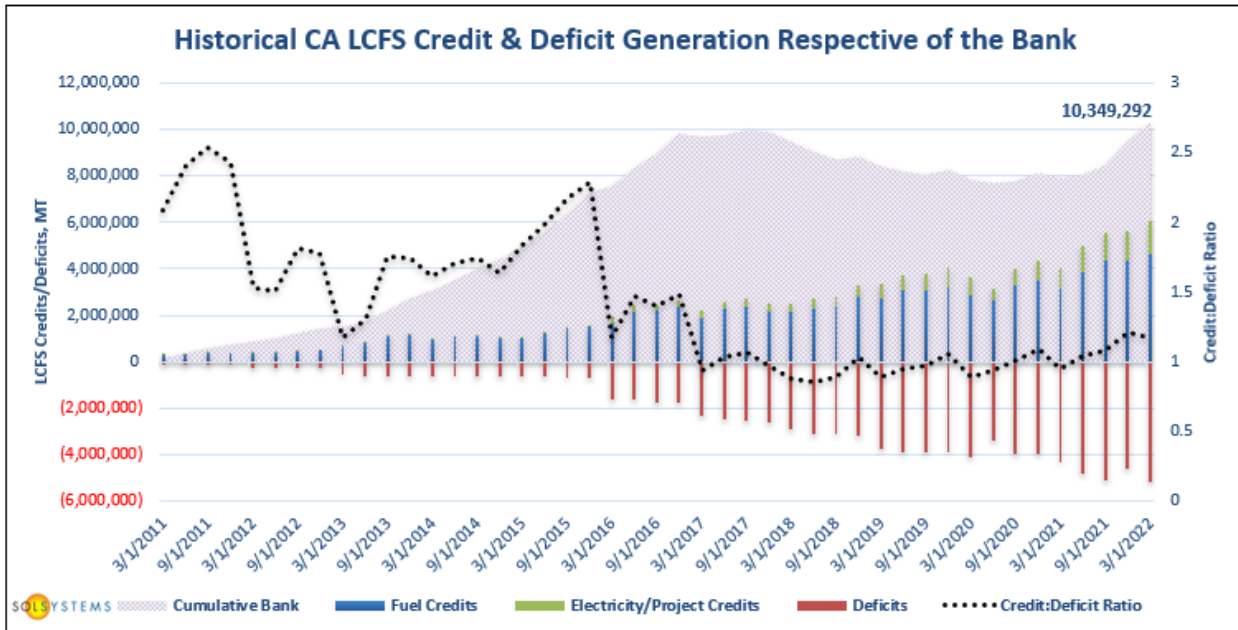
The current level of oversupply is higher than what many market participants expected or industry analysts predicted. Following Q4 2021’s record breaking surplus generation of approximately 980,000 credits, Q1 2022 data posted by CARB on July 31, 2022, shows the second-largest quarter surplus in LCFS program history. Over 890,000 excess credits were generated in Q1, bringing the credit bank total to a record-setting 10.4 million metric credits, more than double the average quarterly deficit levels. Not only has California already achieved its 2022 carbon intensity (“CI”) reduction target of 10 percent from 2010 baseline figures, but it has now surpassed 2023’s target of 11.5 percent.

CA LCFS Pricing August 23, 2022

Delivery Schedule	Bid	Ask
Immediate Delivery	\$88	\$89
Q3 2022 Delivery	\$87	\$90
Q4 2022 Delivery	\$86	\$90
Q1 2023 Delivery	\$85	\$90
Q2 2023 Delivery	\$83	\$88.50



Pricing data obtained from CaliforniaCarbon.info on 8/22/2022.



Data sourced from California Air & Resources Board (CARB) on 8/22/2022

Renewable diesel continues to be secure in its place as the leading credit generator, comprising 37.6 percent of total credits generated. However, the second place slot had a slight shakeup with on-road electricity inching out ethanol for the first time, accounting for 14.8 percent of total credits versus 14.7 percent, respectively. This is also the first time that on-road electricity surpassed RNG, which accounted for 13.5 percent of total credits generated in Q1. On-road electricity credits are primarily comprised of light-duty charging – 69 percent of credits are from residential charging and when combined with public charging, the total increases to 88 percent. This is not surprising given the rate of light-duty electric vehicle (“EV”) adoption in California. Off-road electricity accounted for 7.9 percent of total credits with the majority of that, 73.5 percent, coming from e-forklifts. The pace at which forklifts have been electrifying and the fact that total cost of ownership of forklifts is less than other types of vehicles even without the benefit of LCFS credits has led to some discussion on whether forklifts should be phased out of the LCFS program. Over 50 percent of class 1-5 forklifts are electrified. When on-road and off-road electricity credits are combined, the total number of credits generated in Q1 from the electricity subset is 22.8 percent, significantly more than either ethanol or RNG.

The decline of LCFS pricing has caused many developers to delay some projects or reconsider projects altogether as the economics are not penciling out as many hoped. While these projects getting pushed back or eliminated may have some positive impact on short-term supply levels, the impact will be minimal. Further, with the signature of the Inflation Reduction Act on August 16, 2022, activity across the clean fuels space could pick up drastically, although it remains to be seen how much will happen outside the LCFS programs and how CARB responds.



Policy Tracker

Existing Markets

California

On July 7, 2022, CARB hosted a [half-day public workshop](#) to discuss potential changes to the LCFS. Key areas of discussion once again focused on:

- Steepening the CI curve pre-2030 – The LCFS is currently set with a goal of achieving 20 percent carbon reductions by 2030 over 2010 baseline figures. CARB acknowledged that more aggressive targets are warranted given the over-performance of the market and the urgency of the crisis. Among the updates being considered, CARB is considering potentially increasing the 2030 target to 25 percent reductions over 2010 or an even more stringent 30 percent. Various analyses have noted a target of 30 percent is likely needed to counter the levels of oversupply and bring the market back to a state where demand outpaces supply (and where the LCFS is again driving carbon reductions).
- Adding a declining curve post-2030 – Currently, the LCFS flatlines in 2030 at the current 20 percent target. CARB also acknowledged that more aggressive targets post-2030 are needed to meet the state's carbon neutrality goals. Given the uncertainty around modeling too far into the future, CARB is soliciting feedback on data and studies that should be considered to set post-2030 targets. It is also seeking feedback on whether interim targets are needed between 2030 and 2045, the risks and benefits of setting a 2045 target this far in advance, and when an appropriate timeframe is for setting advance targets.

CARB followed up the July workshop with another on [August 18, 2022](#). Key areas of discussion at this convening included streamlining implementation of the LCFS and updating emissions factors. **Of particular interest to Sol clients is that CARB is considering adding a requirement for 3rd party verification of electricity fuel data.** Electricity is currently exempt from this requirement. However, CARB did note that it is cognizant this requirement would add a significant time and cost burden to market participants and is considering potential exemptions, including one for small credit generators. The threshold for small credit generators may be set around 6,000/credits per calendar year, which is where the 3rd party verification exemption for liquid fuels is currently set.

In the fall, CARB will present various modeling scenarios and solicit feedback. Other areas discussed in the workshop included the phasing out of electric forklift credits, changes to infrastructure credits, and ways the LCFS can support the State's equity and justice goals.

Any changes to the LCFS must align with the State's broader climate goals, which are currently under discussion based on the [Draft Climate Change Scoping Plan](#) ("CCSP") that was released on May 10, 2022. Given the timeline for adoption, the earliest we may see any LCFS changes go into effect is 2024.

On July 22, 2022, Governor Newsom wrote a [letter to CARB](#) arguing that bolder action was required than what was outlined in the draft CCSP. He asked for more aggressive targets to be incorporated into the final CCSP for the offshore wind, residential buildings, and carbon removal sectors, among others. With regards to transportation, Governor Newsom urged CARB to adopt a 20 percent clean fuels target for the aviation sector and asked that CARB evaluate the stringency of the LCFS to accelerate California's transition away from the production and use of fossil fuels.

Newsom's letter to CARB comes on the heels of [a new budget package signed on June 30, 2022](#), that includes several increases in funding for the transportation sector including:

- \$14.8 billion for transportation infrastructure including buildout of high-speed rail and bike and pedestrian pathways, and
- An additional \$6.1 billion for zero emission vehicle ("ZEV") infrastructure, bringing the total to \$10 billion when combined with last year's \$3.9 billion package.

Oregon

Following a series of workshops and public comment periods held earlier this year on expanding the State's Clean Fuels Program ("CFP"), the Oregon Department of Environmental Quality ("DEQ") is finalizing its recommendations to submit to the DEQ's Environmental Quality Commission ("EQC"). The DEQ plans to submit the recommendations in late August 2022. The EQC will then vote on any changes before they become effective (date of vote not yet scheduled). The latest set of proposed changes and public comments from July can be viewed on this [DEQ page](#) (see under Public Involvement section).

Washington

The Washington State Department of Ecology ("Ecology") has been continuing its rulemaking process in anticipation of the State's Clean Fuel Standard ("CFS") launch on January 1, 2023. On July 1, 2022, Ecology released the results of a [third-party economic analysis conducted by Berkeley Research Group](#) ("BRG"). The results indicated that a CFS targeting a 20 percent CI reduction by 2038 would have minimal cost impact on Washington's consumer fuel prices. According to BRG, a CFS would mean less than \$0.01/gallon increase on gasoline prices in 2023, potentially going up to \$0.02/gallon in 2024 and \$0.04/gallon in 2025. The report notes that a CFS along with other transportation initiatives targeting improved air quality would result in \$1.8 billion in economic benefits to the State from better health.

On July 18, 2022, Ecology released further proposed revisions to the forthcoming CFS, relating to [establishing the CI standards, assigning compliance obligations to fuels that exceed the standards, and establishing compliance methods](#). For 2023, Ecology is proposing a 0.50 percent CI reduction for both gasoline and diesel from 2017 baselines. This increases to 1 percent for 2024 and then increases in 100 bps or 150 bps increments until 2033 when 10 percent reductions are required from a 2017 baseline. From 2033 to 2034, there is a significant jump in the schedule with a proposal for gasoline and diesel to achieve 20 percent reductions from 2017 baselines and the 20 percent target remains through 2038. Similar to other established clean fuels/LCFS programs, deficit generators (i.e., compliance entities) can comply in a number of ways, including CI reduction of their fuels or purchasing credits.

A proposal was also put forth to [establish a process for setting fees to recover the cost of developing and implementing the CFS](#). For 2023, Ecology proposed collecting a participation fee with deficit generators' participation fee set to recoup 80 percent of the CFS' estimated annual budget and credit generators' participation fee set to recoup the remaining 20 percent. A public comment period is now open until August 31, 2022. Comments may be submitted via an [online portal](#).

Canada

The final version of Canada's [Clean Fuels Regulations](#) ("CFR") was registered on June 21, 2022, and published on July 6, 2022. The CFR replaces the current Renewable Fuels Regulations and more closely resembles clean fuels programs in British Columbia, California, and Oregon. According to Environment and Climate Change Canada ("ECCC"), which is the agency overseeing the regulation, once fully implemented the CFR will result in a 15 percent CI reduction by 2030 from a 2016 baseline.

Key CFR items of note:

- Only gasoline and diesel producers have annual reduction requirements. The CFR requires a reduction of 3.5 grams of carbon dioxide equivalent (“gCO₂e”) per mega joule (“MJ”) in 2023 from a 2016 baseline and increases to 14 gCO₂e/MJ reduction by 2030.
- The first CI reduction requirements go into effect on July 1, 2023. This date was pushed back from December 1, 2022, as initially proposed to give time for the program to ramp up and to allow for credits to start minting.
- The [Credit and Tracking System](#) (“CATS”) is the platform that will be used to facilitate market participation and the tracking of credits (a credit = 1 metric ton of CO₂e). Primary fuel suppliers that have already produced in or imported to Canada 400 cubic meters (m³) of gasoline or diesel must register on the platform by September 18, 2022. Voluntary market participants and credit generators can register at any time.
- Similar to other existing clean fuel or LCFS programs, obligated parties comply with the CFR through a variety of mechanisms, including lowering their fuel’s CI or purchasing credits. There is also an end of year credit clearing mechanism (“CCM”), similar to California’s CCM where obligated parties can purchase credits. The 2022 price for CCM credits is set at \$300 and will be adjusted in future years by the consumer price index (“CPI”). One element that is unique to the CFR from other programs is that the CFR allows for obligated parties to achieve compliance for up to 10 percent of annual obligations through contributions to an emissions-reduction funding program. The credit price for these contributions is set at \$350 for 2022 and will also be adjusted annually by the CPI.
- The new clean fuels legislation introduced on May 9, 2022 by the Ministry of Energy, Mines, and Low Carbon Fuel Innovation has not moved. If passed, the [Low Carbon Fuels Act \(Bill 15\)](#) would expand the scope of the LCFS program to include aviation and marine fuels, require some utilities to reinvest their LCFS revenue, and enable broader participation in the LCFS market, particularly from projects that capture carbon dioxide directly from air. Bill 15 would replace the Greenhouse Gas Reduction (Renewable and Low Carbon Fuels Requirements) Act passed in 2008.

British Columbia

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Emerging Markets

Q2 was a quiet quarter for LCFS activity in emerging markets. While no major activity occurred with regards to new legislation, several states are continuing discussions and research on the potential benefits of adopting a clean fuel standard. Please see prior Sol Standard newsletters for activity earlier in 2022 below:

- [The Sol Standard: January 2022](#)
- [The Sol Standard: June 2022](#)

In parallel, many states have also recently started to launch various incentive programs to encourage EV adoption as an alternate, perhaps politically easier and more effective pathway to vehicle-based transportation decarbonization. New Jersey, New York, and Vermont have all recently announced rebates and other programs. Illinois is likely to see an emergence of programs as well with the recent appointment of an EV lead following the passage of the Climate and Equitable Jobs Act in September 2021.

With the passage of the federal Inflation Reduction Act, we expect renewed state focus on transportation decarbonization, which may or may not include new clean fuels standards.



THE SOL STANDARD



Federal Update

Biofuels Stakeholders Rejoice with RFS Announcements and Passage of the Inflation Reduction Act

Following several quarters of rollercoaster activity at the federal level related to the Renewable Fuels Standard (“RFS”), there are now several reasons for biofuel market participants to celebrate. First, with regards to the RFS, the Environmental Protection Agency (“EPA”), as part of a [consent decree](#), has agreed to propose 2023 renewable volume obligations (“RVOs”) by November 16, 2022 and final RVOs by June 14, 2023. The consent decree would settle litigation brought by Growth Energy, which sued the Agency for repeatedly missing deadlines on issuing annual RVO mandates. The consent decree was submitted to the U.S. District Court for the District of Columbia on July 22, 2022, and the court is expected to sign off on the decree in the coming weeks. The biofuels industry has long called for the EPA to provide RVOs in a timely fashion as the missed and delayed deadlines cause market uncertainty and negatively impact investment decisions. This decree is one step in the right direction; more importantly, with the EPA setting volumes in 2023, the Agency will be able to set attainable volumes in the first place, streamlining the process considerably.

As the EPA considers upcoming RVOs, there is a strong push from Midwest states for EPA to increase RVO mandates. In a [July 19, 2022, bipartisan letter submitted to EPA Administrator Michael Regan](#), Senators Amy Klobuchar (D-MN) and Chuck Grassley (R-IA) along with 22 of their colleagues, encouraged EPA to consider higher RVOs. They cited the ability of biofuels to reduce fuel prices and greenhouse gas emissions as driving factors for increased mandates. For similar reasons, on July 29, 2022, Senators Klobuchar and Grassley introduced a Senate companion to the House’s *Next Generation Fuels Act (H.R. 5089)*, which would allow the sale of fuels with higher octane levels and greater amounts of ethanol. The legislation is similar to what was introduced in the House in 2021.

While there is still much to be clarified about how the climate and clean energy incentives in the Inflation Reduction Act (“IRA”) will be deployed, the law is another reason for biofuels stakeholders to cheer. Approximately \$500 million in funding is allocated to support buildout of biofuel infrastructure while \$18 billion in funding is set aside for climate-smart agriculture, which could help biofuel producers through the production of lower-carbon feedstocks. Other pools of funding may also be available through the IRA’s initiatives targeting rural America. The IRA also extends several key tax credits for the sector (such as the \$1/gallon blenders tax credit for biodiesel and renewable diesel, which is extended through 2024) and introduces new ones (such as the technology-neutral Clean Fuel Production Tax Credit for transportation fuel produced and sold in 2025, 2026, and 2027).

“When it comes to ethanol and other renewable fuels, this bill represents the most significant federal commitment to low-carbon biofuels since the Renewable Fuel Standard was expanded by Congress in 2007.”

Geoff Cooper, President and CEO, The Renewable Fuels Association

Biofuels stakeholders are not the only ones preparing to ramp up transportation decarbonization. EV and hydrogen stakeholders are also going to see funding and incentives from the IRA to build out infrastructure – particularly EV charging – and boost EV adoption across all vehicle classes. While much remains up to the strength of implementation, one thing is for certain – this historic law is setting up the U.S. for an exponential clean energy growth trajectory.



SOL'S LCFS MANAGEMENT & MONETIZATION SERVICES

Sol Systems provides 100 percent turnkey LCFS management and monetization services to make LCFS market participation as simple and streamlined as possible. Our team provides hands-on, dedicated customer support, a client dashboard for real-time status updates, and transparent & low fees all while offloading the following administrative responsibilities from our clients:

- Fuel pathway certifications
- Fuel equipment registrations
- Reporting
- Compliance filings
- Invoicing & payments
- Carbon intensity ("CI") score optimization / book-and-claim services
- Marketing to buyers
- Inventory management

Sol Systems LCFS management & monetization services help save our clients hundreds of hours and thousands of dollars in cost each year.

Contact Sol Systems to Learn More
lcfs@solsystems.com

Book-and-Claim Services

LCFS and clean fuels programs reward market participants for lower CI scores – the lower the CI of a fuel type, the more LCFS credits will be generated, thereby boosting revenue. While there are a few ways to lower CI scores, one of the faster routes is to purchase and retire renewable energy credits via a process called book-and-claim. Doing so can boost LCFS generation and revenue by 20-40 percent (depending on the client type).

Sol Systems has come across many LCFS market participants that are leaving valuable revenue on the table by not utilizing book-and-claim.

Sol Systems can help clients take advantage of book-and-claim and will manage all of the nuanced requirements associated with the process.

Monetization Options

Sol Systems has pioneered several monetization options for environmental commodities. Whether clients are looking for short-term spot solutions or long-term hedged products, **Sol Systems can help.**

Sol Brokerage

A spot solution that allows clients to take advantage of current market rates.

Sol Annuity

A fixed-price, fixed-term strip that reduces market risk. Clients receive a steady stream of payments regardless of fluctuations or volatility in the market.

Sol Upfront

An upfront, lump-sum payment that helps offset initial capital investment costs and eliminates regulatory risk

Sol Profit Share

A hybrid product that allows clients to lock in a fixed-floor price for a set period, mitigating market risk, while receiving an agreed-upon percentage of upside above a **strike price**. As an added bonus, Sol Systems donates 5 percent of its share to nonprofits working to support renewable energy and sustainability.

Linking LCFS to Impact



Sol Systems has always been a mission-oriented company and we strive to work with our clients so their renewable energy investments have broader community and social impact. In the LCFS market in California, CARB requires that credit proceeds be used to further EV adoption in the state. While there is flexibility in how credit generators comply with this requirement, Sol Systems enjoys working with clients to identify and execute on unique ideas that achieve both transportation decarbonization goals as well as other corporate social responsibility commitments. Examples of programs that Sol can work with clients on include deployment of EV chargers in low-income communities, establishment of EV ride share programs, EV fleet deployment for schools, EV workforce development programs, and more.





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