Breaking the (LCFS) Bank

Noreva's Upside Conviction for California's Fuels Credit Market

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A New Outlook for California LCFS

Executive Summary

Everyone who abandoned LCFS and California fuels markets over the last decade in response to low prices should now take another look.

Noreva forecasts indicate prices are headed much higher, supporting refreshed views on investment in the California clean fuels market.

California's regulators still lack credibility with investors and companies burned by successive U-turns on LCFS credit pricing over the last 15 years, and tolerance for the higher prices implied by the new program parameters remains untested.

While policy risk shadows any position in the California fuel market, the shift in the state's grid mix and the falling relative cost of electric vehicle adoption could create a workable consensus pathway.

Even with a modeled history-defying acceleration in transport electrification and grid decarbonization, the fundamentals expressed in the program structure still imply much higher pricing over the operating life of any new asset.

Noreva's base case forecast implies prices will rise roughly 22% through the end of the decade, then jump by another 45% in the following five years as the carbon intensity methodology tightens.

LCFS Reentry Point

Just as fuels buyers and sellers in California have become accustomed to a lower for longer price regime in the state's determinative Low Carbon Fuel Standard program, a regime break in fundamental supply dynamics is on the verge of resetting prices much higher.

After huge enthusiasm among energy transition investors and companies that accompanied a price surge alongside the LCFS program launch in 2011, the state then faced down a much more dramatic shift in the underlying fuel mix than it had prepared for.

In what became a pattern, the California Air Resource Board began issuing program adjustments designed to water down the very market structure they'd just promulgated.

Arguably this was a realistic response to unforeseen second order consequences of the program, but the resulting collapse in LCFS prices and the persistent buildup of a bank of credits created an anti-investment "worst of both worlds" over the last decade.

Fossil fuel firms slowly but steadily backed away from California as the state kept its ultimate climate goals intact, but the low pricing imposed by a generous banking methodology kept credit prices too low to encourage sufficient buildout of alternative low-carbon fuels.

Investors and companies scarred by the experience have since treated LCFS as a useful booster to biofuel and dairy gas projects that can produce valuable federal RINs but have been followers rather than leaders in building out zero carbon fuels infrastructure at the scale that the state envisioned when originally enacting and implementing LCFS.

Bank Inversion

New trade-aligned Noreva pricing models indicate that the long-running buildup of banked credits in the LCFS program has already inverted.

The overhang will be worked down over the coming months. Before the end of the decade, well within the window for realized asset development timelines for new supply, pricing could gap higher as credit deficits compound.

LCFS program dynamics as currently issued by CARB are clear, and the prospect of a tightening market undeniable.

Nonetheless, the fuels market has been here before. Rising prices from regulatory crediting programs often create their own reflexive response, as regulators take action to cap prices or water down fundamental price drivers.

California's infinity loop of veering guidance on LCFS implementation has succeeded mostly in starving the state of fuel supply and leaving consumers to respond in an ad hoc way to rising fuel prices through increased use of electric vehicles.

California's regulatory thicket has become the stuff of cautionary tales for energy investors and infrastructure companies over the last 20 years, but the state's giant economy continues to make it a crucial component of any ambitious energy markets strategy.

Noreva's models integrate several different regulatory pathways for LCFS over the next 25 years, but even with significant adjustments in the scenario assumptions the core level of CI ambition would have to shift to create material divergence from the inflationary price pathway.

Individual market participants will need to gauge how credible CARB's commitment to LCFS is, but the intent to use higher credit prices to propel the final stretch toward decarbonization of the state's transport sector is clear. The auto-acceleration mechanism that CARB detailed in the new LCFS rules are designed to solve as much for low prices as for high prices.

The Molecule Puzzle

When LCFS launched, the electric vehicle revolution was in its earliest stages, and the program's authors envisioned a proliferation of novel low-carbon molecule-based fuel solutions to replace fossil fuel derived gasoline and diesel without requiring a wholesale replacement of fueling infrastructure.

While allowing LCFS credit revenues to "stack" on federal programs that generated RIN credits did result in a rush of biofuel and biogas projects, the infrastructure for offtake of those fuels was slow to emerge absent a coordinated shift from legacy pipe that favored refined fossil fuels distribution.

California's renewable diesel consumption rose 1800 percent in the decade after the program was launched, and developers and refiners built production capacity amounting to 1 billion gallons by early 2024. Much of the state's consumption has been met by out of state supply, which will be capped under the new program rules.

Dispensing capacity, access to markets and economies of scale all emerged as sharper constraints for molecule-based transport decarbonization via LCFS pricing than expected.

For the highest-value dispensing option for producers the path to monetization remains tight in California and nationally. Noreva forecasts for dispensing of compressed natural gas and renewable natural gas into heavy transport, both of which can earn high volumes of LCFS credits, indicate that growth in all-important fueling infrastructure will be constrained through the mid-2030s.

The Electron Option

Electric drive light duty vehicles, however, became increasingly popular in California. And those vehicles, charging from an increasingly renewables-dominated grid, became a more significant driver of infrastructural turnover and low-carbon transport than other fuel options.

While fueling infrastructure remains a severe constraint for LCFS-generating biofuels, by contrast growth in EV charging infrastructure has accelerated. From 2023 to 2024 alone, California's EV charging network grew by 70%.

So even as the bulk of LCFS credits went to alternative fuels like biodiesel and ethanol, electricity derived from low-CI renewables has reshaped the state's transportation sector.

The share of light duty EVs as a proportion of sales in California grew from roughly 17% in 2020 to 23% in 2025. The state has a target of 35% of sales as "zero emissions vehicles" this year and a steep path to climb to 100% of ZEVs by 2035.

The latest set of LCFS rules reflect this reality, and by 2030 Noreva forecasts that 47% of credits will be generated by electric vehicle charging matched to qualified renewable

generation hours. That proportion will grow to 57% by 2050 if the program parameters remain intact, with bio-CNG grabbing the remaining share because of the super-low carbon intensity of that fuel.

While investors and companies may be skeptical of the long-term pathway for bio-CNG, which is an extremely marginal fuel in 2026 and faces many of the same infrastructure and supply headwinds that have shaped the LCFS program, electric vehicle pathways are proven and the California power grid does grow demonstrably less carbon-intense by the year.

In 2025 the California grid operated with 100% zero-carbon energy for seven hours a day on average, and when hydro and nuclear power are included more than 65% of all retail electricity sales were zero-carbon in 2025. Gasoline sales, meanwhile, have barely budged in recent years, sticking at roughly 13.3 billion gallons in 2025, in line with roughly 13.1 billion gallons sold in 2020.

Simple, But Not Easy

Noreva forecasting incorporates a complex range of inputs, with the objective of including both structured and unstructured data from regulators, investors and markets so that the world they describe is as volatile as the traded markets.

In the case of California's LCFS program, there is a great deal of available performance data and CARB has done an extremely detailed job of describing the pathways buyers and sellers of transportation fuels in California will have to follow as they comply with the state's program.

In tracking the trajectory of the existing fuels sector in California to this point, and the steps that must be taken to meet the state's declared decarbonization objective, the math is clear and compelling. If the state is willing to absorb the cost, then the needed technology spend and the required infrastructure investment is better understood than it was under the original 2011 program design.

Through the end of this decade, what credits remain in the legacy LCFS bank provide a pricing "release valve" that constrains the kind of increases that triggered program reworks in the past. It is in the 2030s that the program's CI math begins to tighten the market much faster, without the benefit of banked credits to cushion the shift.

Noreva's model shows 2040 as the maximum point of pain for California fuels operators, as the CI "spread" between the program's objectives and the state's fuel infrastructure realities are at the widest point. With sufficient investment in the next few years, Noreva's high price scenario, in which prices eventually pass $300/metric tonne in the mid-2040s, could be easily avoided.

To learn more about Noreva's LCFS price forecasts and insight, please contact research@noreva.ai

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