

## Controlling Compliance Costs for California's LCFS with a Price Ceiling

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### Issue

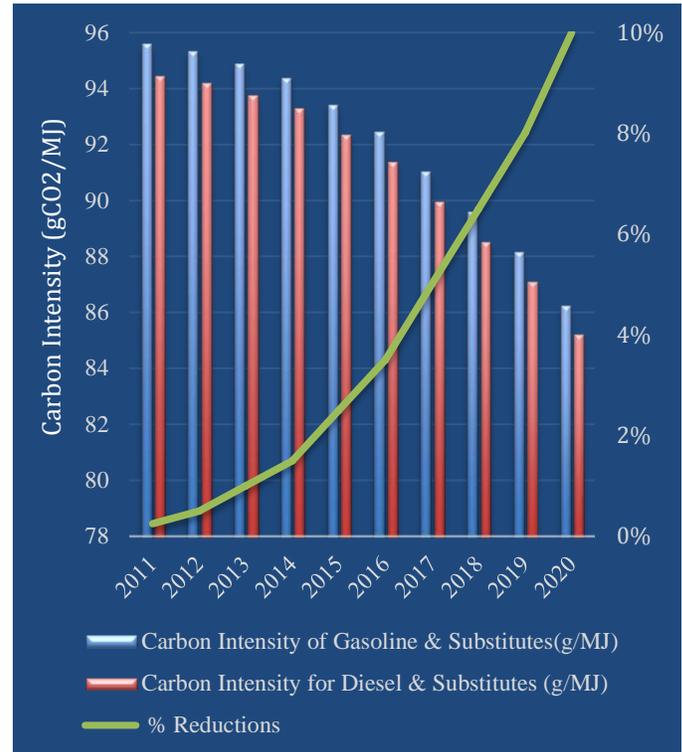
California is a leader in enacting greenhouse gas policies in the United States. A major measure in achieving statewide greenhouse gas reductions required under California's Assembly Bill 32, the Global Warming Solutions Act of 2006, is the state's Low Carbon Fuel Standard (LCFS). The LCFS requires a 10% reduction in the carbon intensity of fuel sold in California over the next decade (Figure 1), and is implemented by the Air Resources Board (ARB). As with any policy which depends on the development and deployment of new technologies to maintain compliance with the program, the LCFS could be susceptible to short-run increases in compliance costs. Our research explores key drivers of compliance costs, as well as provides options to limit costs under the program.

### Policy Implications

A key feature of the LCFS is the inclusion of a compliance credit trading market. Under the program, renewable fuel producers generate credits when they produce fuels with a carbon intensity level that is less than the compliance target for the given year. Similarly, regulated parties (mainly fuel importers and refiners) generate deficits when producing fuels with a carbon intensity level that is greater than the compliance targets. Credits are denominated in CO<sub>2</sub> equivalence, and regulated parties maintain compliance with the LCFS by purchasing an amount of credits to cover their deficits. Credits can be banked for future compliance periods, providing incentives for early reductions and creating inter-temporal flexibility in meeting the program.

The credit market creates substantial flexibility and reduces the regulatory burden of the program. It also provides a direct measure of the costs of the program as the credit price should reflect the cost differential between the most expensive marginal fuel used to meet the standard and conventional fossil fuels. Any large increase in compliance costs should manifest itself directly in the market for compliance credits. In particular, credit prices should increase if producing and consuming low carbon fuels in the state becomes costly.

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**Figure 1. LCFS compliance schedule from 2011-2020 for gasoline and diesel fuel. Note: the compliance schedule is currently under reconsideration and may change. Source: CARB.**

This brief and corresponding paper provide an analysis of options for increasing credit price certainty and reduced price volatility without compromising the greenhouse gas reduction goals of the program.

### Research Findings

Under the LCFS, the key driver of compliance costs is the difference between the price of the marginal (i.e., most expensive) low carbon fuel used to meet the LCFS and conventional fossil fuel prices. In addition, any production or distributional capacity constraints to consuming low carbon intensive fuels will be reflected in credit prices.

The LCFS allows for a wide diversity of fuels to meet the standard including electricity, hydrogen, natural gas, bio-methane, etc. To date, liquid biofuels are the primary generator of compliance credits under the

program (Figure 2). While advanced biofuels, including ‘drop-in’ biofuels that have no downstream infrastructure constraints, have the potential to be cheaper than fossil fuels as more efficient and new production technologies develop into the future, currently they are relatively costly to produce (e.g., see Parker (2012)). Furthermore, blending conventional alcohol fuels at higher than 10% by volume faces certain distribution and usage hurdles. If alcohol biofuels remain the primary compliance option, and if the price of those fuels remains high, relatively high LCFS credit prices may be required in the near term in order to compensate for the difference between the initially higher marginal production cost of low carbon fuels and the market clearing fuel price.

Because firms are allowed to bank credits over time, the anticipation of high compliance costs in the future can increase compliance credit prices before any production or distribution constraints are realized. This anticipation can be amplified by any uncertainty regarding near term development of low carbon fuels and their availability in coming years as the program becomes more stringent.

To address the potential for short-run increases in compliance credit prices, we evaluated the option to establish a price ceiling on compliance credit prices. A price ceiling would guarantee compliance costs never exceeded a given level, and could be implemented in a number of ways including:

- 1) Establishing a credit window where firms can purchase an unlimited amount of compliance credits from the ARB at a fixed price;
- 2) Creating a fixed penalty for any excess deficits accrued in a compliance period.

Both mechanisms give firms alternative compliance opportunities in the program. Namely, if credits from low carbon intensive producers are costlier than the credit window price or the noncompliance penalty, firms can comply with the program by purchasing credits from the ARB or paying the penalty, limiting the exposure of the firms to credit price increases.

Beginning in 2015, all emissions from the combustion of fossil fuels will be covered under the state’s cap and trade program. As a result, any increase in carbon emissions from fossil fuel producers due to firms using the alternative compliance mechanism under the LCFS will require additional emission reductions under the cap

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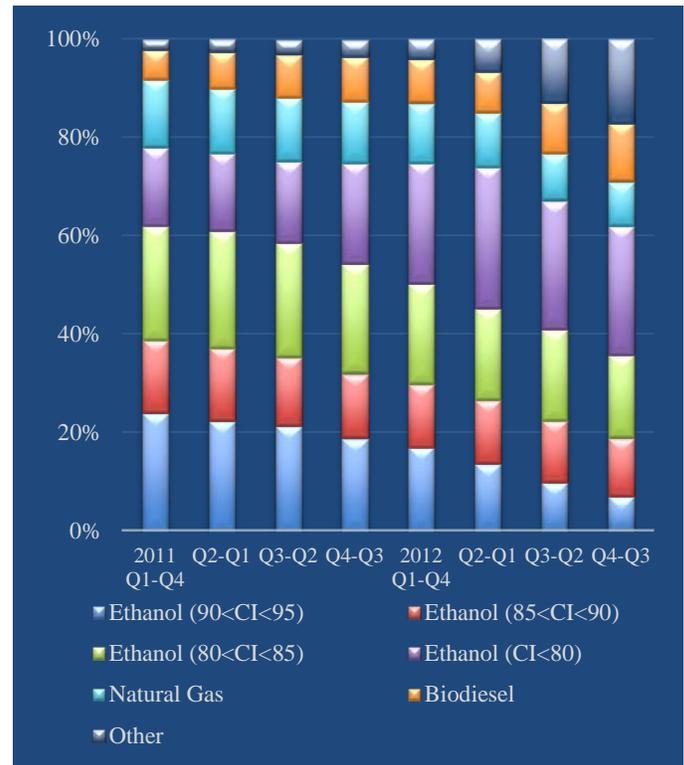


Figure 2. Percentage of total compliance credits generated by each fuel type under the LCFS to date. CI denotes carbon intensity. Source: CARB

and trade program and the environmental integrity of the program will remain intact.

In addition to instituting a cap on compliance credits, it is also possible to institute a price floor for compliance credits. A price floor in tandem with a price ceiling would send a signal to investors in low carbon fuels about the maximum and minimum value of credits in the future. Implementing a price floor would require the state to guarantee the purchase of credits below a given price.

### Further Reading

This policy brief is drawn from the full report, Lade, G., Lin, C. (2013). “[A Report on the Economics of California’s Low Carbon Fuel Standard & Cost Containment Mechanisms.](#)”

Parker N. (2012). “[Spatially Explicit Projection of Biofuel Supply for Meeting Renewable Fuel Standard.](#)” *Transportation Research Record*, 2287, pp. 72-79.

Yeh, S., Witcover, J. (2014). “[Status Review of California’s Low Carbon Fuel Standard.](#)” ITS, UC Davis, Research Report UCD-ITS-RR-14-01