



NEW INDUSTRY STUDY

THE IMPACT OF THE LCFS ON CALIFORNIA'S TRANSPORTATION FUEL MARKET

California's Low Carbon Fuel Standard (LCFS) policy is designed to promote dramatic change in the state's transportation sector and liquid fuel markets. The regulation is already impacting refiners, consumers, blenders, traders and related companies. PIRA's latest study will offer insight into this complex policy approach and improve decision-making of key stakeholders.

The Impact of the LCFS on California's Transportation Fuel Market

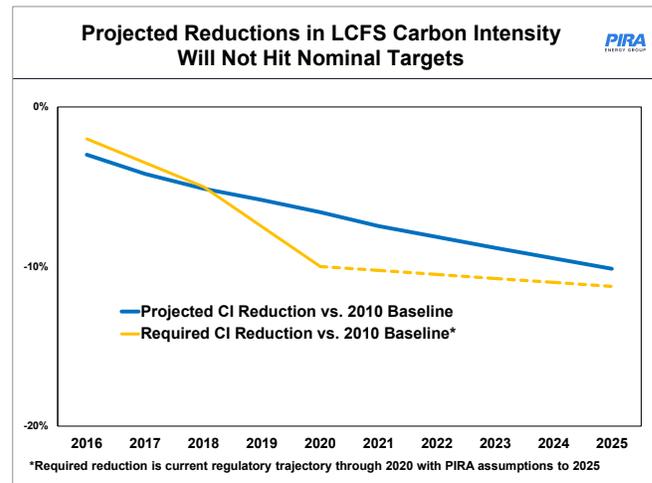
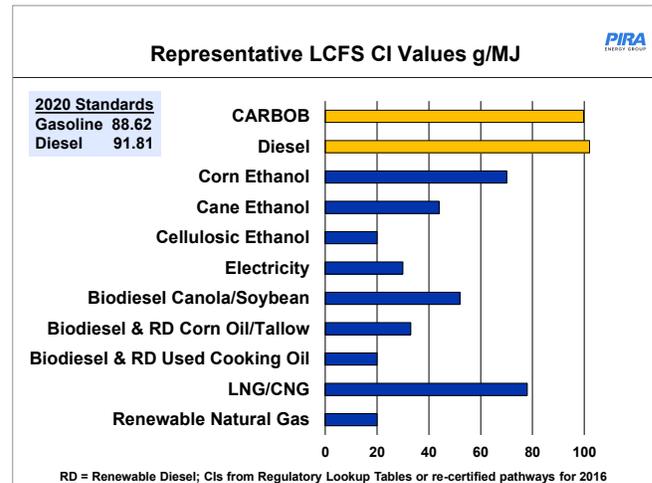
California's Low Carbon Fuel Standard (LCFS) policy is designed to promote dramatic change in the state's transportation sector and liquid fuel markets. The regulation is already impacting refiners, consumers, blenders, traders and related companies. PIRA's multi-subscriber study offers a close assessment of the regulation (as it currently stands, with consideration of potential policy changes) projecting the composition of California's market for transportation energy use and in particular, demand and pricing of fuels over the next decade. The development of this program can also have broader implications, as other jurisdictions are considering implementation of such policies. PIRA's study offers insight into this complex policy approach and improve decision-making of key stakeholders.

BACKGROUND AND OVERVIEW

The California Air Resources Board (CARB) has established a Low Carbon Fuel Standard (LCFS) designed to reduce greenhouse gas (GHG) emissions in transportation fuels in order to fight climate change. All fuels are assigned carbon intensity (CI) values according to their GHG emissions over a life cycle. The program was re-adopted in late 2015, and key changes to the standards, CI methodology, and other program details were implemented during 2016. To comply with the law, fuel suppliers must reduce the CI of transportation fuels each year by specified percentages. A 3.5% decrease this year will increase sharply to 10% by 2020.

The LCFS is very complex, consisting of hundreds of pages of regulations and related documents. New CI values underwent re-certification in 2016. A progress report is scheduled for later in 2017, with a full program review required in 2019. Complicating matters, the LCFS is a cornerstone policy for transportation sector reductions needed to meet Governor Jerry Brown's aggressive 2030 GHG target. Additional tightening is expected post-2020.

In an attempt to offer compliance flexibly (and thus reduce the cost of achieving the goals) the LCFS also establishes a credit system and allows for trading. Given the serious challenges of achieving a 10% reduction in 2020, fuel suppliers are building a surplus (bank) of these credits in the early years of the program for future compliance use. After rising \$100/MT from an average of \$22 in May 2015 to \$122 in February 2016, LCFS pricing fell last year and is currently around \$96 as of February 2017.



The LCFS credit market is currently oversupplied, with a growing bank, in advance of accelerated tightening of the standards. Moreover, concerns over regulatory certainty increased this summer, with speculation that the LCFS could somehow be weakened/used as a bargaining chip to secure support for tightening and extending beyond 2020 the economy-wide cap trade program for California, Quebec and likely Ontario.

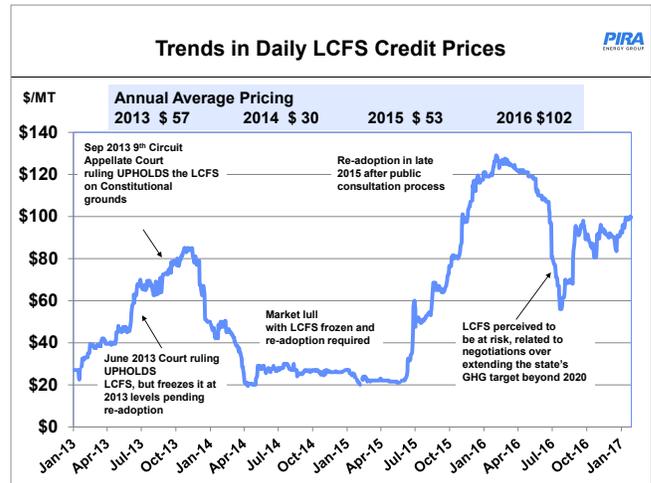
Cost Containment for the LCFS is through the Credit Clearance Market, which imposes a cost threshold of \$200/MT (\$2016) and allows for the carryover of deficits that cannot be reconciled in a given year.

There is a clear need for key stakeholders- fuel suppliers, biofuels producers, electric vehicles providers, CNG, LNG, and RNG suppliers to understand how the LCFS will work and how it will influence their businesses.

PROJECT SCOPE

The policy is intended to be technology neutral, rewarding approaches that offer greater reductions in CI. Electric vehicles, natural gas and biogas in transport, ethanol, cellulosic ethanol, biodiesel, renewable diesel, demand reductions are all potentially part of the policy solution – offering a particularly wide open array of potential outcomes.

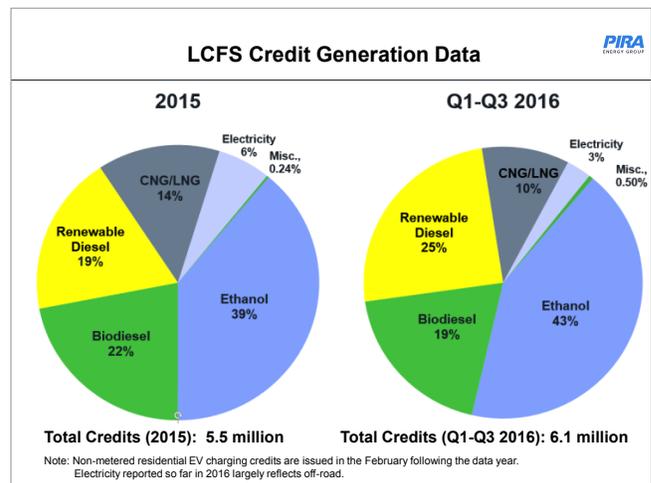
The use of biofuels has been the key way of complying with the LCFS, because of their availability and low CI values. Low Carbon Fuel Standard credit generation for 2015 and the first three quarters of 2016 (the latest data available) is shown in the pie chart to the right. Ethanol and biomass-based diesel (conventional biodiesel plus renewable diesel) generated 87% of the LCFS credits.



RESEARCH FEATURES OF "IMPACT OF CALIFORNIA'S LCFS"

The study features a review of the current market and annual forecasts to 2025 for the items shown below:

- **Currently dominant California fuels – gasoline and diesel consumption and prices.**
- **Volume of biofuels by product type to meet Federal and California regulatory requirements.** LCFS assessments also include estimates of natural gas, biogas, electric vehicle and hydrogen usage for compliance.
- **California carbon Cap and Trade Market Allowance price forecast** – offering additional price incentives to move away from fossil fuels in transport.



- **Prices of D4** (biomass-based diesel), **D5** (advanced biofuels) and **D6** (mostly corn-based ethanol) **RINs**.
- **Forecast Prices of Biodiesel and Renewable Diesel**
- **A discussion of potential values of LCFS Credits**

STUDY DELIVERABLES AND TIMING

- **Executive Summary** (8 pgs.)
- **Report in Power Point form including detailed charts and graphs of forecasts** (101 slides) (Table of Contents at right)
- **Excel data set available for download**
- **Webinar to discuss findings**

PIRA will present the final results and explain in depth the key takeaways of the study in a live (and later recorded) webinar on March 14, 2017. The results of the study will be addressed by its authors, who will discuss the specific market implications of these findings. Clients will have the opportunity to ask questions.

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Custom Scenarios

Please contact your PIRA sales representative if you are interested in PIRA developing tailored scenarios – price to be determined.

Workshop Option

For an additional fee, buyers may choose to have a private (online or on-site) briefing of the study's findings. Such an option allows for a more thorough dialog with the study authors as well as some customization of the presentation. Arrangements (location, date, etc.) are made on a case-by-case basis.

WHO WILL BENEFIT FROM THE IMPACT OF LCFS ON CALIFORNIA FUEL SUPPLY?

The following market participants can all benefit from this study:

- **Energy companies-** refiners, and gasoline/diesel producers-will be able to make better-informed decisions on where and when to secure biofuels, improving flexibility and diversifying for the sources for their businesses. This will forecast the value of the Carbon Fuel Credits and assist companies in determining how much they should bank for future years.
- **Blenders, traders, storage companies, and shippers** will be able to anticipate supply/demand changes. This analysis will aid in understanding business opportunities
- **Biofuels manufacturers- ethanol, biodiesel and renewable diesel producers** will be able to benefit from PIRA's forecasts better identify market opportunities.

- **Suppliers of CNG-** particularly biogas manufacturers will be able to better understand the demand and pricing for their product.
- **Electrical Vehicle Manufacturers-**will be able to estimate the demand for their products.
- **Technology Companies-** offering processes for manufacturing low carbon intensity fuels will be able to identify investment and licensing opportunities.

AUTHOR BIOS

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Managing Director | [Global Power, Emissions and Clean Energy](#)

Roman Kramarchuk is leading efforts to expand PIRA's environmental /emissions offerings to meet the demand of clients looking for a deeper focus on renewables, technology and policy across the globe. Roman heads up PIRA's Greenhouse Gas Emissions and North American Environmental Markets services, which focus on assessing environmental policies and implications for the energy sector, including specific environmental markets such as the California Cap and trade system. Prior to joining PIRA in 2005, he was at the U.S. EPA, developing key energy emissions regulations at the Clean Air Markets Division. With PG&E NEG and PA Consulting / PHB Hagler Bailly, he evaluated strategies regarding power sector fuel choice and capital investments and advised on asset valuation. Roman also worked on energy sector USAID- and World Bank-funded projects in the FSU and India. He has an M.P.P. from the Kennedy School of Government at Harvard and a B.A. in economics and B.S.E. in systems engineering from the University of Pennsylvania.

Dr. Bruce H. Pickover

Senior Director | [Global Biofuels](#)

Dr. Bruce H. Pickover manages PIRA's Global Biofuels Retainer Service. He began his career at ExxonMobil where he worked on petrochemicals and the refinery/chemical interface. Bruce spent 27 years at consulting company Chem Systems, where he was responsible for the Petroleum and Petrochemical Economics (PPE) program, multi-subscriber reports, and commercial proprietary studies. Bruce has a Bachelor's of Chemical Engineering from the City College of New York and earned an M.Ch.E and a Ph.D. from New York University.

Jennifer McIsaac

Director | [Emissions and Clean Energy](#)

Jennifer McIsaac follows environmental and regulatory trends, contributing to regular reports on U.S. federal policy initiatives and regional carbon markets as well as conducting special analysis. Prior to joining PIRA in 2001, her experience in the energy industry included positions at NUI Corp., the parent company of several gas utilities, and at Exxon Company International. Ms. McIsaac has a B.A. in mathematics from Drew University and an M.A. in economics from Cornell University.

Corey Lavinsky

Director | [Global Biofuels](#)

Corey Lavinsky joined PIRA in 2009 and is responsible for tracking and analyzing world biofuels markets. He co-authors all of the team's reports, including Biofuels Weekly Update, Weekly Ethanol Supply Report, Global Biofuels Monthly Forecast, Biofuels in Developing Markets, and World Biofuels Forecast. Prior to joining PIRA, he was the CEO of Growthink Research, a venture capital research firm. He began his career as an attorney with a prestigious St. Louis law firm. He has a J.D. from the University of Missouri and a B.A. in mathematics from Binghamton University.

The Impact of the LCFS on California's Transportation Fuel Market

Acceptance Form

Complete the form below and email to PIRA at sales@pira.com.

(Company Name) _____ wishes to subscribe to the study "The Impact of the LCFS on California's Transportation Fuel Market."

We understand and agree that the fees are as follows: The fee is **\$6,995**

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