

October 6th, 2017

Sam Wade
Chief, Transportation Fuels Branch, Industrial Strategies Division
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Re: Comments on LCFS regulatory workshops

Dear Mr. Wade,

UCS is very supportive of the path towards 2018 LCFS amendments laid out in the August 7th and September 22nd workshops. We look forward to a stronger policy with a longer time horizon as a result of this process.

An 18% 2030 target is inadequate to support steady investment and growth in low carbon fuels

We urge CARB to adopt a higher target for 2030 than the 18% value discussed in the workshop. We believe that more ambitious targets are achievable, and review of the draft illustrative compliance scenario calculator reveals several areas in which assumptions underlying the SCP-ZEV baseline are inappropriately pessimistic. For example, the calculator does not include continued progress reducing biofuel carbon intensities (CIs). The LCFS has already led to substantial improvement in fuel CI scores. Considerable technical opportunities remain for CI improvement from most low carbon fuel supply chains, and the LCFS will provide a concrete incentive for fuel producers to seize these opportunities. Some of these CI reduction opportunities are incremental improvements that can support steady progress; we also anticipate some dramatic changes. For example, corn-kernel fiber and other cellulosic ethanol technologies are scaling up now, and carbon capture and storage is poised for more widespread application before 2030. Ethanol production facilities are among the most cost-effective opportunities to adopt CCS, as less CO₂ separation is required than separating CO₂ from flue gases at power plants. These technologies offer even deeper CI reductions than are possible with incremental technology improvements.

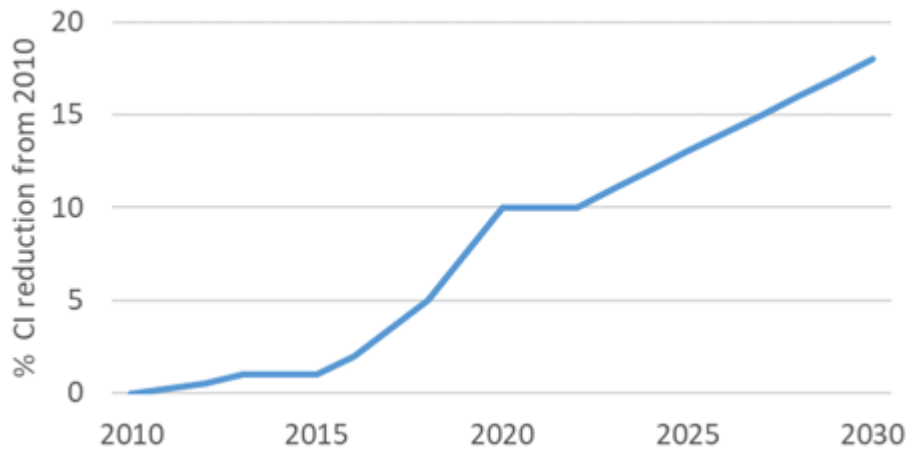
We also note the possibility that by 2030 a high-octane gasoline, composed of 25% ethanol, may be available and recommended by auto manufacturers for a significant share of new gasoline powered vehicles. The existing scenario development tools allow for no consideration of high-octane gasoline, which in our estimation may be more significant than E85 by 2030. The present scenarios show the total volume of ethanol declining in lock step with gasoline. The prospect of a steadily shrinking market discourages investments in more advanced ethanol technology. The prudent phase-in of high-octane gasoline can support faster reductions in petroleum components of gasoline and encourage investment in low CI

ethanol production technology. Based on the scenario calculator, a phase-in of high-octane gasoline together with CI improvements of ethanol and other biofuels could support overall CI targets several points higher than under default assumptions.

We believe there are other areas in which the CARB scenarios are too pessimistic, including EV deployment, potential refineries emissions reductions and aviation biofuels. We do not have detailed recommendation on these points today, and in many cases the extent of feasible credit generation depends upon the provisions CARB finalizes in the 2018 amendment process.

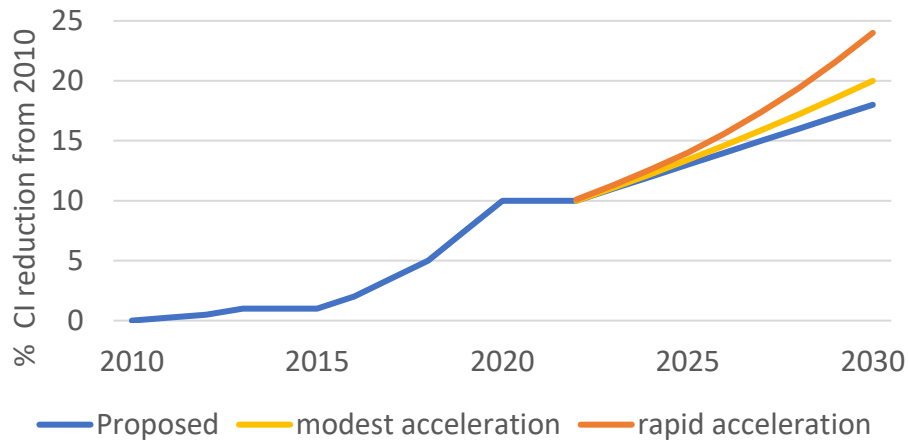
Steadily increasing LCFS targets are the best way to support growth in low carbon fuel production

The proposed schedule of CI targets (illustrated below) is not well designed to support steadily increasing investment and growth in low carbon fuels.



CARB's biofuels supply module suggests that the proposed compliance schedule is likely to lead to a spike in credit prices around 2020, then a steady decline in credit prices across the rest of the compliance period. Particularly after 2025 the size of the light duty liquid fuel pool will be shrinking due to efficiency and electrification, which means the same quantity of low carbon liquid fuel will result in a larger CI reduction. At the same time, investments in low carbon fuel production will be coming on line and ramping up. These two factors will lead to accelerating credit generation, and with a constant rate of CI increase, one would expect the credit price to fall steadily. The prospect of a credit price spike followed by a steady decline is not ideal to draw investment into the low CI fuels sector. Instead CARB should endeavor to propose a compliance schedule that gives market participants an expectation of long term credit price stability.

We urge CARB to consider not just raising the 2030 target, but particularly raising the level of ambition in the later years. In the figure below, I have illustrated 20% and 24% standards achieved with standards that accelerate in the later years, growing from annual increases of 1.1% in 2023 to 1.4% in 2030 for the 20% standard, and from 1.1% to 2.4% for the 24% standard.



The question of whether 20% or 24% target is feasible depends in significant measure on details of credit generation opportunities that may arise through the 2018 amendments through broader use of renewable electricity, refinery emissions reductions and aviation fuels, as well as other factors like the deployment of high-octane gasoline. While I hope to provide more quantitative guidance in the future, I have some general comments now. It is important to balance new credit generation opportunities with more ambitious targets to ensure that new pathways do not depress credit prices and dampen investment in low carbon fuels. We urge CARB to open new pathways wherever the data supports their benefits, and set appropriately more ambitious targets, which should result in CARBs credit price estimation tools showing sustained credit prices at well over \$100/ton through the compliance period, rather than steadily declining credit prices.

Amendments should facilitate the use of renewable electricity for transportation

Accelerating the use of low carbon electricity is the single most important long-term strategy to achieve transportation fuel system consistent with deep decarbonization, and aligning fuel policy incentives in the LCFS with this goal can complement other zero emissions policy initiatives. We strongly support efforts to develop provisions for wind and solar generation for fueling as much of the EV fleet as possible, but stress that these provisions must provide support for additional investments, and avoid wasteful overlap with other renewable energy policies. We also urge CARB to consider an electricity pathway for biomethane. The methane emissions mitigation benefits of biomethane pathways are available whether the fuel is used in a CNG vehicle or an electric vehicle, and the use of biomethane based power in EVs confers numerous other efficiency and air quality benefits that merit treating these two uses of biomethane on an equal footing.

We support the development of the third-party verification program, updates to CA-GREET and OPGEE, switching to more timely electricity data than e-GRID, and allowing alternative jet fuel producers to generate credits. We also support refinements to provisions that encourage oil producers and refiners to directly mitigate emissions from their supply chain. Oil extraction, refining and the use of petroleum products accounts for the vast majority of fuel sector emissions, so it makes sense to encourage innovation and emissions reductions in this sector, provided the integrity and additionality of the emissions reductions can be verified. We look forward to reviewing these details as these are available.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Martin". The signature is fluid and cursive, with the first name "J." and the last name "Martin" written in a single continuous stroke.

Jeremy Martin, Ph.D.
Senior Scientist and Fuels Lead
Clean Vehicles Program