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Dr. Cheryl Laskowski Branch Chief, Transportation Fuels California Air Resources Board 1001 I Street, Sacramento, CA 95814

Dr. Laskowski and CARB Staff,

Thank you for the chance to once again provide feedback to the diligent and thoughtful process that you have overseen in order to create a more perfect Low Carbon Fuel Standard. The program has been effective in creating a robust ecosystem promoting the decarbonization of the transportation sector. Among other positive outcomes, CARB has succeeded in guiding the private sector to invest in companies and projects, adopt new types of vehicles, and switch to new fuels, simultaneously cutting carbon emissions, improving health outcomes, and growing the state's economy.

At the same time, it is clear to all engaged market participants that it is time to adjust and accelerate the LCFS program. The data release on January 31 showed that Q3 2022 had a surplus of 1.7M credits, the second straight quarter of a record-setting surplus position and the sixth-consecutive quarter of credit bank growth. The market has realized a pace of decarbonization that is faster than was previously thought to be feasible; this is an achievement and should be celebrated as such – the program is working! – but also represents a challenge as we aim to achieve substantially deeper GHG cuts. The credit bank's large build over the past two years has resulted in a saturated market, causing the price of credits to drop 70% in the face of excess supply. Meanwhile, expected increases in new fuel production capacity (especially renewable diesel) alongside rapid EV adoption is expected to continue and to accentuate this trend. This outcome would be problematic; in the absence of getting the market back on track today, developers will not start the long process of building the infrastructure needed to reach deeper levels of decarbonization, such as those required by the Scoping Plan. By the time the market properly incentivizes project development at the speed and scale needed, it will be too late given the necessary permitting and construction timelines, putting the goals of the Scoping Plan at risk; that is to say, we need the program to incentivize action today.

In order to do so, there are four adjustments that, taken together, would encourage investment and would enable the state to achieve the Scoping Plan's goals. Those changes are:

- 1) a step-down in the CI target in 2024 to 19%;
- 2) a 30% CI reduction target for 2030;
- 3) an Acceleration Mechanism; and
- 4) reforming market participation requirements.

The first proposed change is a step-down in the program's CI reduction target for 2024. Amending the 2030 target as CARB has discussed in Public Workshops is a powerful though blunt tool and is appropriate for influencing the LCFS program's long-term trajectory. However, in order to deal with the key problems the market is facing today – a large credit bank, substantial quarterly surplus positions, etc. – CARB should allow the program to catch up to where the market already is. While the Q3 2020 CI reduction was 7.6% (relative to the 2010 baseline), the market reached 13.3% reduction in Q3 2022; after increasing by 5.7% in two years, the market was already ahead of the annual CI reduction targets for 2023 and 2024, and is just behind that for 2025. As such, the current target is too far behind reality. Adjusting the 2024 CI reduction target to be 19% below the baseline (another 5.7% compared to the current performance) will halt credit bank growth and stimulate new project development.

Provided CARB adopts a 19% CI reduction target for 2024, 30% is an appropriate target for 2030. Given the current supply of low-carbon fuels, forecasted additions to these supply capacities based on announced projects, and the required rates of vehicle electrification under the Advanced Clean Cars II and the Advanced Clean Trucks regulations, modeling indicates that the market should achieve 30-32% CI reduction by 2030. As such, a target of 30% should promote continued decarbonization. If CARB were to maintain linear decreases to the CI reduction target or use a lesser step-down than the suggested 19%, a 2030 target above 30% would be justified.

A struggle of the LCFS program since the initial outbreak of COVID-19 in the US has been the volatility of credit prices. Regardless of the value of credits, high volatility is toxic to investment and development, and as such it is good policy to employ structures to promote a stable, predictable, rule-based environment. To this end, adopting an Acceleration Mechanism will result in a market which is more resilient and less prone to falling out of balance due to administrative processes. The proposed design of this feature is detailed in the appendix herein.

Lastly, CARB should reconsider how regulations pertaining to who is allowed to participate in the LCFS promote the long-range goals of the program. While the intent of the definition of Opt-In Entities was good, the result of this has been the creation of a market with few buyers – an oligopsony, in economics-speak. This is a problem in that the parties regulated under the LCFS – the natural long-term buyers of credits – have effectively shut down the advancement of fixed-price, long-term contracts to monetize LCFS credits. As a result, project debt investors have largely written off LCFS-linked projects as too risky, too weird, and too hard to understand. As one of the very few who has successfully negotiated a long-term offtake contract acceptable to institutional investors and subsequently raised debt financing, I've have lived through the pain of this process, which is exacerbated by the market power held by a small number of regulatorily advantaged parties. By reforming the requirements for Opt-In Entities, CARB could fix this market inefficiency by enabling competition for credit purchasing and promoting proper allocation of market risk, all to the benefit of the state's decarbonization efforts.

I look forward to working with CARB Staff over the coming months to design appropriate amendments to the LCFS program to ensure its continued effectiveness. Thank you for working diligently on this matter and for the care paid to the concerns of each stakeholder in the process.

Regards,

Jelen M. Gehlum

Asher Goldman Principal, Net Negative Partners The Wharton School, University of Pennsylvania

Appendix: Acceleration Mechanism Design

Since submitting comments in December 2022, I have worked with a variety of program stakeholders to refine the design of an Acceleration Mechanism. The structure is intended to enable the CI reduction schedule to adjust automatically under specific criteria being satisfied.

These criteria (the "trigger" for the mechanism) would be best set as being activated when the quarterly difference between the realized CI reduction and the CI reduction standard, averaged over the previous four quarters and weighted by energy use, exceeds 1%. These are defined in Equations 1, 2, 3, and 4, with each CI value in terms of percent reduction relative to the 2010 baseline:

Equation 1: $CI_{Achieved,q=t} = CI_{Standard,q=t} * \sum Credits_{q=t} / \sum Deficits_{q=t}$

Equation 2: $CI_{Delta,q=t} = CI_{Achieved,q=t} - CI_{Standard,q=t}$

Equation 3:
$$CI_{WtdAvg,q=t} = \sum_{q=t-3}^{q=t} (CI_{Delta,q} * E_q) / \sum_{q=t-3}^{q=t} (E_q)$$

Equation 4: Trigger Acceleration Mechanism when $CI_{WtdAvg,g=t} \ge 1\%$

Showing the above for the current moment, we can see that the recent overperformance has pushed the 4-quarter weighted average CI reduction well-beyond what the threshold would be.

Quarter	Cl Reduction Target (A)	Credits (B)	Deficits (C)	Achieved Cl Reduction (D = A*B/C)	Cl Delta (D – A)	Energy Use
Q4 2021	8.75%	5,610,494 MT	4,692,610 MT	10.47%	1.71%	538.4 PJ
Q1 2022	10.00%	5,841,746 MT	5,150,501 MT	11.34%	1.34%	515.5 PJ
Q2 2022	10.00%	6,755,930 MT	5,392,896 MT	12.53%	2.53%	542.9 PJ
Q3 2022	10.00%	6,939,512 MT	5,206,472 MT	13.33%	3.33%	529.0 PJ
Wtd Average					2.23%	

To ensure that the Acceleration Mechanism properly captures the overperformance, the above calculations should be done at each data release date. Provided CARB were to keep the existing schedule, this would mean performing the calculations on January 31, April 30, July 31, and October 31. Once the Acceleration Mechanism has been triggered, the future CI reduction targets would each be adjusted by the same magnitude as the $CI_{WtdAvg,q=t}$. This is reflected in Equation 5.

Equation 5: $CI_{NewStandard,q>t} = CI_{Standard,q>t} + CI_{WtdAvg,q=t}$

In order to promote an orderly environment in which business operations and financials can be forecasted and planned, the impact on CI reduction targets should be implemented at the proximate January 1 from the time of the acceleration event. This would result in, for example, an acceleration event from Q3 2022 (data released on January 31, 2023) impacting the CI reduction target for 2024 and onward.

Finally, an additional step is needed to prevent the double counting of realized CI reduction. In Equation 2, we defined $CI_{q,Delta}$ as the difference between the actual CI reduction and the then current CI reduction target; after an acceleration has occurred, however, this must be adjusted for the fact that we have now adjusted the future CI for the overperformance in those four quarters. To do this, each CI_{Delta} , starting from the first quarter resulting in the acceleration event (i.e., q = t-3), should be reduced by the magnitude of the acceleration, or the $CI_{WtdAvg,q=t}$. Mathematically, this will always result in the recalculated $CI_{WtdAvg,q=t}$ (calculated using the 4-quarter trailing period) equaling exactly 0. In making this adjustment, we ensure that a brief overperformance does not lead to cascading acceleration events, but instead is entirely accounted for in one acceleration.

Equation 6:
$$CI_{Delta,new,q \ge t-3} = CI_{Delta,old,q \ge t-3} - CI_{WtdAvg,q=t}$$

= $CI_{Achieved,q \ge t-3} - CI_{Standard,q \ge t-3} - CI_{WtdAvg,q=t}$

This is demonstrated in the table below using data from the past 5 quarters (the CI_{WtdAvg} calculation uses data from Q2 2020 through Q4 2020 not shown here). Note that in the absence of making the adjustment using Equation 6, Q3 2022's data would have resulted in a second acceleration in as many quarters in-line with the table shown on the previous page.

	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023
Data Release	7/31/21	10/31/21	1/31/22	4/30/22	7/31/22	10/31/22	1/31/23	4/30/23	7/31/23
CI _{Standard}	8.75%	8.75%	8.75%	8.75%	10.00%	10.00%	10.00%	10.00%	11.25%
Cl _{Achieved}	8.22%	9.09%	9.40%	10.47%	11.34%	12.53%			
CI _{Delta}	-0.53%	0.34%	0.65%	1.71%	1.34%	2.53%			
CI_{WtdAvg}	0.04%	0.19%	0.33%	0.57%	0.99%	1.55%			
Trigger?	No	No	No	No	No	Yes			
Adjustment to CI _{Standard}	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.55%
CI _{NewStandard}	8.75%	8.75%	8.75%	8.75%	10.00%	10.00%	10.00%	10.00%	12.80%
Adjustment to CI _{Delta}	0.00%	0.00%	-1.55%	-1.55%	-1.55%	-1.55%	-1.55%		
CI _{Delta,new}	-0.53%	0.34%	-0.90%	0.16%	-0.21%	0.98%	1.78%		
CI_{WtdAvg}						0.00%	0.68%		
Trigger?						No	No		