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14 August, 2019

James Duffy, Branch Chief
Industrial Strategies Division, Transportation Fuels Branch
California Air Resources Board
1001 I St.
Sacramento CA, 95814

Re: Proposed Low Carbon Fuel Standard Cost Containment Mechanism

Dear Mr. Duffy,

Thank you for the opportunity to comment on the proposed modifications to the Cost Containment Mechanism of the LCFS. The Institute of Transportation Studies at the University of California, Davis (ITS-Davis) has a long history of research and engagement in the development of fuel carbon intensity policies, such as California's Low Carbon Fuel Standard (LCFS), the Oregon Clean Fuels Program and British Columbia's Renewable and Low Carbon Fuel Requirements Regulation. ITS-Davis researchers were involved in the original development of California's LCFS and we continue to research low-carbon fuel technology and policy, as well as produce regular status updates about the performance of the LCFS.

We appreciate the open and constructive discussion surrounding these proposed changes, including the July 31st workshop. These comments relate to the issue of time-dependence of greenhouse gas emissions, and continue the line of discussion raised in our April 26th letter.

The Proposed Changes Appear to Reduce the Risk of Multi-year Deficits

The basic structure of the proposed changes, to bring credits from future years forward to counteract near-term deficits should offer a transparent and predictable mechanism for credit price containment. It should be noted that scenarios from both CARB and independent researchers indicate the many pathways to compliance present target levels, without persistent system-wide deficits.¹ However, a credible cost containment mechanism represents a critical design element of robust, stable environmental policy and prudent approach to risk management even when the risk of exceeding the price ceiling is low. Moreover, it should also be noted that the borrowing mechanism may impact compliance in later years when the

¹ Most of the scenarios presented in the CARB Illustrative Compliance Scenario calculator indicate sufficient supply to meet a 20% target trajectory, this is confirmed by work presented in the California's Clean Fuel Future report.
https://nextgenamerica.org/wp-content/uploads/2018/04/Cerulogy_Californias-clean-fuel-future_Update_April2018.pdf

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program is under a more stringent standard. The extent to which the new reinvestment provisions affect utility LCFS credit revenue, EV deployment patterns or credit availability in the late 2020's is unknown.

Shifting From a Fixed Period of Borrowing to a Floating Borrowing Window Creates a Risk that Deficits Could go Un-Repaid

The July 31st presentation indicated that rather than fixing the period in which the borrowing option was available to the years 2020-2025, the borrowing provisions would be open at any point during the LCFS and that the repayment schedule over five years take effect after five years have elapsed from the initial borrowing event. Shifting to a flexible borrowing window would increase the program's capacity to respond to credit shortages whenever they occur, beyond the tight credit period in the early to mid-2020s foreseen in both CARB's Illustrative Compliance Scenario Calculator and the modeling work cited above.

The definition of "Borrowing Window" needs some additional clarity; does the five year period before repayment commences apply once for each borrower, or for each tranche of credits borrowed? The workshop discussion suggested that if a regulated entity borrows credits under these provisions in 2022 and again in 2023, the credits borrowed in 2023 repaid on the same schedule as those borrowed in 2022, rather than the five year window restarting for the second borrowing event, but the presentation language was not clear on this point.

We would also note that moving to a flexible borrowing window opens the possibility that repayment could be scheduled for 2031 or later, as in the example presented on slide 11 of the July 31st presentation. Without a deeper exploration of the legal and regulatory implications of post-2030 repayment, it is difficult to understand the implications of the proposed repayment schedule, but they could impact the credit market prior to that time, given the time flexibility of credit use.

The Proposal Lacks Consideration of the Time-Dependence of GHG Emissions

As discussed in our April 26th letter, the proposed cost containment mechanism effectively eliminates one vital element of the previous provisions: the "interest" rate on carried deficits. This provision was intended to not only incentivize obligated parties to take action to prevent the emergence of persistent negative credit balances, but also to reflect current science regarding time-dependent impacts of GHG emissions. We refer you to the previous letter for a description of the mechanism, as well as the peer-reviewed journal article which describes the method for calculating these impacts.

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At the July 31st hearing you indicated concern about the method of repayment proposed in the April 26th letter being too complex and making utilities whose credits are borrowed effectively liable for the repayment of a debt which was not incurred through their actions. These are reasonable concerns and as noted in our previous letter, there are several mechanisms by which the fundamental problem of excess warming potential incurred by the proposed rule could be repaid. The mechanism suggested in the April 26th letter, as well as the one suggested below, are offered as examples of how the excess warming allowed by the current proposal could be counteracted, and are not intended as advocacy in favor of any particular solution. There are a number of plausible mechanisms for addressing the unabated warming which would occur each time the proposed borrowing mechanism was used, we would be happy to work with you to identify the best one for this purpose.

Responding to the feedback provided at the July 31st workshop, which indicated that the suggestion we highlighted in our April 26th letter put too much burden on utilities to pay and required too much analytical effort to calculate Radiative Forcing factors resulting from time profiled emissions, we would suggest the following approach as an alternative:

When a party uses the borrowing provision to address an outstanding deficit, in addition to the credits they borrow to cancel the deficit, they would be assigned a number of deficits whose aggregate warming effect was equal to the warming caused by utilization of the borrowing mechanism. This would not change the repayment of the credits borrowed under this provision, utilities would still retire credits according to the proposed schedule. These additional deficits would be deposited *in the account of the entity who bought the borrowed credits through this provision, to satisfy an un-met deficit*. Unlike regular deficits, these would be exempted from the obligation to be matched by credits in the year they are issued and instead could be held, without additional interest or penalty, and repaid at any time up to the final year in the repayment schedule associated with that borrowing event.

The amount of additional deficits the borrowing entity would incur would be based on the warming effect in 2050 of the delay in emissions reductions. Based on the schedule presented in slide 11 of the July 31st presentation, the warming effect in 2050 of credits borrowed in 2022 and repaid as scheduled would be approximately equal to 28% of the number of credits borrowed.

For example: Assume an entity borrows 100,000 credits in 2022 under the July 31st proposal. 100,000 credits would be generated for the utility, sold to the entity at the specified ceiling price and used to retire their outstanding deficits. In addition to the 100,000 credits, the entity purchasing the borrowed credits would also receive 28,000 deficits, which must be discharged by matching to credits no later than the 2031 compliance period. The borrowing entity would have the option of repaying these deficits at any time prior to 2031, which would increase their

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flexibility to wait for preferential market conditions, or to develop their own credit-generating projects.²

This mechanism shields the utilities whose credits are being borrowed for the purposes of this provision from any additional liability to counteract the warming effect the borrowing of credits would cause. The entity which triggered this provision by carrying an un-met deficit would be obligated to pay back an extra tranche of deficits, however the extended payback window would allow ample flexibility to purchase credits for the payback at an opportune time, or make investments in credit generation. The administrative burden would be limited to tracking a limited number of deficits which would differ from yearly-covered and credit clearance mechanism carryover deficits only in that they can be held year to year without penalty until a specified future year.

As noted above, the authors of this letter underline the importance of environmental and scientific integrity in the design and implementation of the LCFS for it to fulfill its intended objective as a key component of a robust and effective climate change mitigation policy. The suggested mechanism is one option for doing so, but not the only feasible one. We would be happy to work with LCFS program staff on developing additional alternatives, if desired.

[Appropriate Consideration of Time Dependence Protects the Environmental Integrity of the Program and Limits Some Risks Discussed at the July 31st Workshop](#)

At the July 31st hearing, one commenter observed that banked credits would have an un-accounted for net cooling effect in a similar fashion to the way in which borrowed credits would have an un-accounted for net warming effect, and suggested that additional provisions to counteract the excess warming may not be necessary if the amount of credits borrowed under these provisions was less than the aggregate bank of credits. We agree that as long as there are more banked than borrowed credits, the aggregate effect of un-accounted LCFS effects will be towards net cooling. However, borrowing provisions could well be utilized in an environment where any existing bank of credits had been largely drawn down, so the proposed borrowing provision cannot rely on this effect to counteract the excess warming caused by borrowing; a more robust protection would be required that functions under any level of banked credits.

CARB could consider making provisions to mitigate excess warming caused by time-dependent effects of emissions conditional on a net negative balance of borrowed and banked credits, that

² If desired, CARB could offer a pre-payment bonus, to encourage early retirement of outstanding deficits. This would effectively reduce the amount of excess warming caused through this borrowing mechanism by reducing the residence time of excess emissions in the atmosphere. Based on the methodology presented in the April 26th letter, moving emissions reductions a year earlier increases their net effect on 2050 warming by about 2%, which would be a viable approximation for a yearly pre-payment bonus. We recognize CARB's desire to avoid complexity and stress that pre-payment bonus provisions are optional.

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is, assigning additional deficits to the account of the entity purchasing the borrowed credits only if a sufficient aggregate bank of credits does not exist before the borrowed credits are repaid. Doing so would increase the complexity of the program and generate greater uncertainty for entities regarding the cost of borrowing credits.

Additionally, several commenters at the July 31st workshop indicated concern that the lack of liability for invalid crediting on borrowed credits may create a non-monetary incentive for obligated parties to prefer the borrowing option to buying credits on the market, since borrowed credits would be shielded from invalidation risk. The clearinghouse function of the credit clearance mechanism may provide some protection against this, when credits are available to purchase. Other commenters noted potential asymmetrical price risks. While having one-sided price movement is a feature of being at cost containment boundaries, we have not had the opportunity to search the literature for research on its practical impact in this type of policy, and cannot comment on their significance. Note, however, that a well-designed price floor, if it were implementable, could help move price expectations back to where they would be in an untruncated price market. We would note that something akin to the interest rate charged under the existing carried deficit provisions, such as the future-dated deficits described in the section above, could mitigate the potential that asymmetrical price risk, or avoidance of reversion risk would make it financially more attractive for obligated parties to use the borrowing provision rather than obtaining credits through normal market mechanisms.

Thank you again for the opportunity to comment on the proposed changes to the LCFS Cost Containment mechanism, we appreciate the robust and transparent discussion and look forward to continuing to engage. If we can offer any clarification to this letter, or assistance to the broader process, please contact Colin Murphy at cwmurphy@ucdavis.edu or +1(530)754-1812.

Signed,

Colin Murphy, Ph.D.
Deputy Director, Policy Institute for Energy, Environment, and the Economy
University of California, Davis, California, USA

Julie Witcover, Ph.D.
Assistant Project Scientist, Policy Institute for Energy, Environment, and the Economy
University of California, Davis, California, USA