UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

POLICY INSTITUTE FOR ENERGY, ENVIRONMENT, AND THE ECONOMY

30 April, 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 April 5th workshop. These comments relate to the issue of time-dependence of greenhouse gas emissions, which I raised as a question during the workshop. My colleague, Julie Witcover, submitted a separate comment discussing other aspects of this proposed change, these letters complement each other and we ask for your consideration of both.

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

The basic structure of the proposed changes, to bring credits from the 2025-2030 time period forward to counteract near-term deficits should allow deficits to be addressed and "repaid" in a transparent and predictable fashion. It should be noted that projections from both CARB and independent researchers indicate a very low likelihood of such deficits emerging at present targets levels.[1] However, a credible cost containment mechanism represents a prudent approach to risk management even when the risk of exceeding the price ceiling is low.

[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

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

The proposed cost containment mechanism effectively eliminates one vital element of the previous provisions: the "interest" rate on carried deficits. Under the existing rule, obligated parties which carry a negative credit balance were assessed an additional deficit obligation of five percent of the negative credit balance. This provision was, in part, designed to incentivize obligated parties to take action to prevent the emergence of persistent negative credit balances. Critically, this provision was also in part intended to reflect a comprehensive and nuanced understanding of climate science and its omission in the draft proposal reduces the scientific credibility of the proposed provisions.

Greenhouse gases (GHGs) affect the climate over time, by trapping radiant energy from the sun near Earth's surface. The net warming effect is a function of the amount of GHGs in the atmosphere and the amount of time they reside there. This means that a tonne of GHGs emitted today produces more net warming over the next century than the same tonne of GHGs emitted five years from now. The converse is also true, reductions today reduce net warming more than reductions in the future. The proposed provision, which pulls credits from the 2025-2030 time period forward to counteract current deficits functionally delays emission reductions. The credits are applied to counteract pre-2025 deficits, but the emissions reductions which generate those credits do not occur for several years. While this mechanism works from an accounting, or mass-balance standpoint, it overlooks the temporal element of climate change.

Several peer-reviewed studies have quantified this time-dependent effect and a more sophisticated understanding of this phenomenon was reflected in the IPCC's 5th Assessment Report. One of the signatories to this letter (Dr. Kendall) published an article and developed an Excel-based calculator to assist in incorporating Time-Adjusted Warming Potential (TAWP) effects into global warming potentials used in carbon footprinting and life cycle analysis.[2]

Omitting of time-dependent warming effects introduces a significant error in GHG accounting, in situations like crediting emissions reductions in years other than when they actually occur. When the crediting occurs before the reduction, this results in a potentially significant amount of warming which is un-recognized by the GHG accounting methods used by the LCFS program. Based on the methodology presented in the Kendall paper and using the TAWP calculator that we have attached to this submission, we evaluated several illustrative scenarios which

[2] Kendall, A. (2012). Time-adjusted global warming potentials for LCA and carbon footprints. International Journal of Life Cycle Assessment, 17(8), 1042–1049. http://doi.org/10.1007/s11367-012-0436-5

An Excel-based calculator is attached to this submission. This calculator is an updated version of the one published in the supplementary materials associated with the above study, updated to reflect IPCC AR5 radiative forcing effects of key GHGs.

represent plausible applications of the proposed cost containment mechanism. If a deficit of 1 million LCFS credits emerged in 2023 and was addressed using this proposed mechanism, then paid back according to the schedule presented at the workshop (deductions of 50,000, 100,000, 200,000, 300,000 and 350,000 credits in 2026, 2027, 2028, 2029 and 2030, respectively), the amount of cumulative radiative forcing - the net heat trapped by excess GHGs (GHGs emitted as near-term deficits to be counteracted at a future time) would cause an amount of climate warming in 2050 equivalent to about 182,000 tonnes of carbon dioxide emitted in 2023. California has adopted statutory targets for GHG reduction by 2030 and administrative targets for GHG reduction by 2050, and there is overwhelming scientific evidence that substantial reductions must occur during that time period to avoid catastrophic harm. As such, this significant amount of unaccounted warming represents an obstacle to the State's overall progress toward climate targets.

In order to ensure that the LCFS meets its programmatic goals, as well as the expectations expressed in the Scoping plan, this excess radiative forcing should be counteracted by the retirement of some additional amount of compliance credit in excess of the amount pulled forward. So long as the net radiative forcing of the credit issuance and retirement equals zero by 2050, the program will have met its obligations and maintained its scientific integrity.

We recognize that introducing a calculation to evaluate cumulative radiative forcing effects adds complexity to the implementation of this program. This could be mitigated by amending the payback schedules in the current proposal. There are a number of plausible payback schedules which would successfully reduce cumulative warming effects to zero by 2050. This allows CARB a significant degree of flexibility in designing a payback schedule for each year a deficit could be incurred, that could be presented in tabular form. We would be happy to work with your staff on the development of an approach which balances simplicity of implementation against the need to mitigate climate harm.

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

Alissa Kendall, Ph.D.
Professor, Department of Civil and Environmental Engineering
University of California, Davis, California, USA