Researchers at UC Davis Policy Institute

Please see the attached file, with comments from myself, Colin Murphy, and Jin Wook Ro at the UC Davis Policy Institute for Energy, Environment, and the Economy.

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

25 April, 2022

State of Washington, Department of Ecology
Regarding: Clean Fuels Program Rule Chapter 173-424 WAC – Informal Comment Period

Dear Clean Fuels Program Rulemaking Team:

Thank you for the opportunity to comment on the ideas and materials related to the draft CFP rulemaking in Washington State. We appreciate the open stakeholder process that the Department of Ecology (Ecology) has undertaken to date, for this informal comment period leading up to the drafting of the proposed rule. The University of California, Davis Institute of Transportation Studies, along with the Policy Institute for Energy, Environment, and the Economy has been engaged in research, policy analysis, and technical assistance relating to alternative fuel policy for well over a decade. This letter provides comments on the draft proposed rule and the life cycle analysis tools that will support it. Please find several comments below, in no particular order.

Carbon Intensity for State-Level Electrical Grid Generation in WA-GREET

As described in the March 2022 webinar, since Washington fuel mix disclosure data categories do not match those for fuel sources in the GREET model, some categories in the former were merged or reassigned into new categories in the latter. For example, 'cogeneration', 'landfill gas,' and 'unspecified' in the fuel mix disclosure data were, along with 'natural gas,' included in 'natural gas' GREET category, and 'waste' and 'other' were included, alongside 'petroleum,' in the GREET model under 'residual oil.' More detail on how the recategorization is being implemented may be needed. While including cogeneration and landfill gas in the natural gas category seems reasonable based on similar chemical and physical properties, they use different sources of feedstock,and the life cycle carbon intensity of such sources can be significantly different. This could impact CI scores of all pathways using electricity. Moreover, given the LCFS' focus on carbon intensity, and aim of supporting novel approaches to reduce GHGs, aggregating these sources for the grid-average CI score could have impacts on fuel producers or utilities seeking to use lower-carbon forms of natural gas to reduce emissions. Additional documentation of source fuel CI scores and their treatment in the aggregation process, and a shift to more disaggregated sourcing when possible, would improve the CI score accuracy and as a signal for behavioral changes. In particular, a more thorough explanation of the treatment of the relatively high fraction of 'unspecified' sources, from the disclosure data to the GREET model, seems warranted, given that at 12.93%, it exceeds the share of natural gas (7.33%). While fully characterizing the source of energy delivered through common-carrier utilities presents challenges, and the source component of the grid CI-score is relatively small compared to Electricity Production for Stationary Use, it is important to lay out the rationale for this over other treatments, and guard against creating an inadvertent incentive to not reveal (use “unspecified”) sources of energy.

The document also notes that the existing Northwest Power Pool (NWPP) mix has been retained to maintain the consistency with the CA LCFS and OR CFP. However, as acknowledged in the document, its accuracy could well be distorted by the carve-out of OR and WA state-level grids, absent further adjustment. The importance of the NWPP electricity mix for the CI score of petroleum fuels imported from Montana and Utah warrants additional analysis to confirm the magnitude of the impacts. There are reasons they might not be negligible: the proportion of electricity from hydropower is relatively high in the NWPP region, and in Washington and Oregon, states which would be carved out in the new NWPP mix, so the extent to which those states contribute to the NWPP CI score is germane. Having a timeline for correcting this misalignment is important.

Finally, a rationale for the year of grid electricity chosen (2018) should be provided, distinguishing between its role in calculating the baseline year CI score, and compliance years moving forward.

Electricity Carbon Intensity Options

The draft rule discusses both utility-specific and statewide electricity CI scores. More detail is needed on whether the program, as in Oregon, allows a utility to choose which CI score to apply. There, the choice can be annual, which could lead to cherry-picking lower CI scores but choosing the grid-average in higher CI years. This would make crediting less reflective of real trends over time in CI score of electricity used for charging. More generally, time-of-use CI scores are more representative of GHG impact than averages, although there are data limitations preventing their use in some situations. Moreover, the option to claim low- or zero-CI electricity via indirect accounting mechanisms (e.g., REC retirement), given its relative ease, may effectively dilute or remove the incentive for time-of-use charging.

Residential Charging Estimates

An accurate and evidence-based method for generating LCFS credits is extremely important to ensure the program continues to provide incentive in proportion to real-world emissions impact. At present, most EV charging occurs at the vehicle owner’s home; comparatively few homes have metering systems to account for EV charging load, separate from household demand. Most CA LCFS and OR CFP credits for residential EV charging are generated by estimating the amount of electricity consumed by EVs within a utility’s service area. While this method can yield accurate results, it depends on accuracy of the assumptions and input parameters used in generating the estimate. Recent research has indicated that existing estimates of per-vehicle electric VMT or at home charging may not accurately reflect real-world behavior.[1]

Ideally, LCFS credit generation from EVs would be based on metered charging data, however given the relatively immature state of EV charging infrastructure, and the lack of dedicated meters for EVs in most homes, such data is often unavailable. Washington must take care to ensure estimation methods are as accurate as possible. Additionally, providing options for stakeholders, including EV owners, to retain their LCFS credits if they meter their charging behavior and provide this data to the regulator, could help support more accurate estimation methods, and ultimately, a transition towards metered data becoming the default within the program over the long run.

Indirect Land Use Emissions Estimates for Washington Clean Fuels Program

ILUC emission estimation is characterized by high uncertainty and variability. Some modeling has shown a downward trend in ILUC emissions from corn-based fuels, as highlighted in the presentation, but uncertainty remains high and not all models show lower CI scores– see for example, the Daioglou presentation at the recent EPA workshop on biofuel GHG modeling.[2] Moreover, retrospective analysis provides a new tool for evaluating ILUC. A recently published study from Lark, et al. finds extremely high ILUC impacts for corn to date, and the scientific debate about the study and its results is ongoing.[3,4] The uncertainty around ILUC effects for lipid-based fuels, such as those from vegetable or residual oils, may be even greater. The high uncertainty around ILUC estimates reflects data limitations as well as analytical assumptions and framing choices within the models used. As highlighted by the Peer Review (and Diaoglou presentation cited above), consideration of multiple models and approaches, and the range of estimates described by the full body of literature on this subject, to inform policy design would yield a more comprehensive approach than attempting to identify a particular model or study for setting Washington's CFS ILUC provisions.

Ultimately, given the significant uncertainty in this space, ILUC policy involves weighing the magnitude of risks arising from overestimation or underestimation of actual risk. If the LCFS ILUC adjustment value is greater than the real-world impact, then the program would tend to overestimate the real life cycle GHG impact of resulting fuels, and provide less incentive than optimal, leading to under-consumption of these fuels and Washington missing the opportunity to reduce emissions by their use. Conversely, if the ILUC adjustment is less than the real-world

[1] https://www.nber.org/system/files/working_papers/w28451/w28451.pdf

[2] https://www.epa.gov/system/files/documents/2022-03/biofuel-ghg-model-workshop-luc-emission-estiim-2022-03-01.pdf

[3] https://www.pnas.org/doi/10.1073/pnas.2101084119

[4] See comments on the paper by Taheripour et al. and author reply (https://greet.es.anl.gov/publication-comment_environ_outcomes_us_rfs, and https://files.asmith.ucdavis.edu/Reply_to_Taheripour_et_al.pdf, respectively), as well as a recent ex post evaluation of the RFS by Taheripour et al. assigning less of a role for that policy on biofuel and crop prices (https://www.frontiersin.org/articles/10.3389/fenrg.2022.749738/full .

ILUC impact, then the program would underestimate the real life cycle GHG impact, leading to more incentive than optimal and likely over-consumption of such fuels. This boils down to: *Underestimation of ILUC can contribute to over-consumption of fuels that come from feedstocks that carry ILUC risk, and vice-versa.* Of those two, over-consumption of fuels carrying a significant ILUC risk likely presents greater and longer lasting GHG risks. Over-consumption of fuels carrying ILUC risk would lead to undesirable levels of land conversion, and the loss of soil carbon as well as above-ground biome carbon. Once lost, these stocks of carbon can take a decade or more to recover, once land is taken out of cultivation. Conversely, under-consumption of fuels carrying ILUC risk foregoes potential emissions savings. However, if methods to limit or reliably assess risk are put in place, an incentive to innovate to lower CI scores of existing fuels, could still remain, as would an option to scale up production should risk be reliably deemed lower. Given that the GHG and other market-related risks (e.g., potential impacts on food prices or biodiversity) from underestimating ILUC are likely to be larger in magnitude and very likely to produce longer-lasting harm than the risks of overestimating ILUC, a risk-averse decision on this subject would be to choose policy values for ILUC estimates for the purposes of the proposed LCFS closer to the upper end of the range of values found in literature. The proposed value from the LifeCycle Associates report, 7.6 gCO2e/MJ, is among the lowest found in literature at present, and therefore may represent a higher-risk approach to ILUC risk management. The next comment also speaks to the use of models for ILUC estimation.

Indirect Land Use Change Effects of Sorghum and Cover Crops

The rationale for using a different conversion factor analysis for corn and sorghum than for other fuels is not clear. While Oregon uses a CCLUB value for its corn ethanol ILUC estimate, a rationale for choosing that value (one scenario among several in the cited paper) was not provided in the regulatory materials, and the value is not applied to sorghum. The two grains are, moreover, not direct substitutes for each other, and the ILUC should be differentiated as shown in other studies and practices. Indeed, conversion factor modeling choice (for example, AEZ-EF, as in California, or CCLUB), is a key element of the larger ILUC modeling discussion, with the importance of data sources and perspectives on the history of cropland as pasture being particularly salient. This was highlighted in the Peer Review report and presentation, as well as in Session 6 of the EPA workshop on Biofuel GHG modeling,[5] and 2015 comments to the Oregon rulemaking focusing on CCLUB by AEZ-EF model developer Richard Plevin.[6]

Finally, an ILUC value of 0 for carinata was proposed in the LifeCycle Associates report, on the assumption that it is a cover crop *and* would not displace other uses. The Peer Review report calls out the need to back up these assumptions. This highlights a broader point – ILUC risk is ultimately a function of both feedstock and its context, and generalizations about context based on feedstock alone risk inaccuracy and error, and require further indirect impacts

---

[5] https://www.epa.gov/renewable-fuel-standard-program/workshop-biofuel-greenhouse-gas-modeling

[6] https://drive.google.com/file/d/1cMDft6iVnWukFlz0n_T760yoSznKCj6C/view

analysis. Indeed, the feedstock/context issue is not limited to crop feedstocks. Feedstocks produced as byproducts may have market value and use, that if used for biofuels would need at least partial backfilling, and could, especially if used in higher volumes, cause substantial unwanted indirect effects.

Incremental Deficits

A way to track petroleum fuels' CI score over time is important for accurate accounting of Washington's transportation fuel pool. Assigning additional deficits for petroleum fuels if a CI score increases above a threshold amount is important for aligning incentives with use of cleaner fuels. California's LCFS has such a provision, and has seen increasing CI scores of petroleum fuels result in additional deficit generation in 2020, 2021, and 2022. To the extent that Oregon's fuel pool derives from similar sources as Washington's, this tracking of deficits could also create a positive spillover for its CFS program accounting or implementation.

Cost Containment Measures

The proposed Credit Clearance Market (CCM) mirrors similar mechanisms in effect in California and Oregon. Note that the CCM in itself provides a soft credit ceiling; there is no mechanism akin to California's advance crediting provision to support the ceiling price. However, the draft proposal does not include interest accrual on deficits, assessed in California and Oregon programs. This interest can be interpreted as functionally accounting for the real-world warming impact of delayed emissions reductions that would occur if an obligated party carried deficits to subsequent compliance periods. In Washington, credit shortfalls post-CCM, moreover, prompt Ecology action to find and address root causes. This, in addition to outlined deferral mechanisms, jointly would help contain costs in the event of systemic credit shortfalls. Over-reliance on deferral mechanisms could undermine the program's incentive signal to invest in low carbon fuels, especially when deferrals do not accrue interest. And, the proposed timeline for a forecast deferral analysis (early October) and announcement (early December) for a deferral starting in January could introduce market uncertainty in times of credit tightness.

Advance Credits

The proposal allows for advance credits in the case of several types of projects or vehicles tied to the state. More clarity is needed on estimation methods for advancing credits, especially for projects not directly tied to alternative fuels/vehicles, and provisions to safeguard the program's environmental integrity should payback not occur as planned.

Fast-Charging and Fuel Cell Fueling Infrastructure Credits

It is important to distinguish these credits that are *not* tied to CI reductions in program accounting, and not present them as CI reductions due to the program, for more accurate assessment of the program's impact. California's LCFS infrastructure capacity credit provisions have supported a number of projects, however they may introduce a number of market balance, equity and other challenges that complicate long-term planning and carbon accounting.[7] In particular, adding credit generation without a corresponding deficit obligation from related fuels will tend to reduce overall program stringency. While supporting ZEV infrastructure deployment clearly helps Washington meet its long-run climate goals, and is included in the statute, it is extremely challenging to weigh the value of future emissions reductions supported by ZEV fueling infrastructure against near-term deployment of fuels that actually reduce emissions, yet the addition of infrastructure credits establishes this weighing mechanism in a fashion that assumes a high level of precision. Additionally, incentive revenue under a LCFS flows from high-carbon fuels, predominantly gasoline in extant LCFS programs, to low carbon ones. Infrastructure capacity credits redirect this revenue to support deployment of infrastructure that may support future vehicles, but the value of such support cannot be known at this point. LCFS programs are intended to provide policy incentive proportionate to the emissions reductions offered by a fuel; since it is impossible to know the magnitude of emissions reductions, it is impossible to establish a proportionate incentive level.

Petroleum Fuel Project Credits

The draft rule mentions refinery investment credits under obtaining a carbon intensity. If modeled after the provision in California's LCFS, these credits would reflect CI reductions from an own-facility baseline. Note that this is a static measure, in contrast to the declining CI benchmark used for generating deficits and other alternative fuel credits; for a given credit price, such an investment would thus generate similar credits per fuel volume over time (in contrast to the fewer credits earned over time by an alternative fuel of a given CI score, due to the declining CI benchmark).

Pathways Certified in Other Jurisdictions

As described in the March 2022 webinar, Dept. of Ecology is planning to accept the fuel pathways which were already certified in California and Oregon by CARB or OR-DEQ. Accepting these pathways, with adjustments for WA-GREET including in terms of fuel transport distances and ILUC as noted, helps maintain consistency across the states and aid with verification in all jurisdictions, if done carefully mindful of conditions that may vary depending on the geographic locations.

Low-Income and Vulnerable Populations

The statute recognizes the need to evaluate Clean Fuels Program impacts on low-income and vulnerable populations, and includes as options for electricity credit revenue

---

[7] https://www.arb.ca.gov/lists/com-attach/256-lcfs18-AmxcPwd+ByADYlUw.zip See: Pages 5-17 of the NextGen Comment Letter.

electrification projects benefiting these communities. It is important to recognize the degree to which historical transportation, energy, and fuel policy decisions reflect and even exacerbate historical inequities. More research is required to fully understand the impacts of policies like the Clean Fuels Program on disadvantaged communities within most jurisdictions because public health impacts of fuel policy are highly place-dependent.

A carbon-intensity standard like the Clean Fuels Program provides incentives to replace high-carbon fuels, especially petroleum, with lower-carbon alternatives. Thus far, these alternatives almost always reduce criteria pollutant emissions when displacing petroleum fuels. Existing research has shown a pronounced tendency for low carbon fuel programs to date to see more credit generation from displacement of diesel than gasoline,[8] lowering emissions relative to diesel for those most exposed to transportation-related air pollution and its ill effects, especially particulate matter from diesel, typically disadvantaged communities. In absence of policy or market forces to the contrary, we would expect a similar pattern of compliance, through the first decade at least, which would help Washington's program address this contribution to poor outcomes for disadvantaged communities and peoples. This impact, critical in the shortest run, would wane as the heavy-duty fleet turned over to engines/vehicles that have lower, or zero, emissions, due to this or other policies. However, evaluating the impact of this, and other program aspects (like electrification projects targeting this population) on low-income and vulnerable populations is critical, as soon as is feasible post- implementation.

Thank you again for the opportunity to comment on the development of Washington's LCFS. Please feel free to reach out to us if we can clarify anything discussed in this letter, or if we can help connect you to any recent research on this topic. We can be reached by email at cwmurphy@ucdavis.edu, or by phone at (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

Jin Wook Ro, Ph.D.
Postdoctoral Scholar, Policy Institute for Energy, Environment, and the Economy
University of California, Davis, California, USA

---

[8] Multijurisdictional Status Review of Low Carbon Fuel Standards, 2010–2020 Q2;California, Oregon, and British Columbia https://escholarship.org/uc/item/080390x8