



August 31, 2022

Department of Ecology
Air Quality Program
Attn: Rachel Assink
PO Box 47600
Olympia, WA 98504-7600
<https://aq.ecology.commentinput.com/?id=KTPeV>

**Re: WA Clean Fuels Program Rule and Air Quality Fee Rule
Chapter 173-455 WAC**

Dear Ms. Assink:

LanzaJet¹ appreciates the opportunity to comment on the Washington State Clean Fuels Program Rule and Air Quality Fee Rule (Proposed Rules). LanzaJet strongly supports the numerous stakeholder comments regarding the inclusion of incentives for the production and use of alternative jet fuel (AJF), also known as Sustainable Aviation Fuel (SAF), in the state of Washington. We comment separately to emphasize the need for the Washington State Department of Ecology (WA DOE) to consider more robust provisions for AJF beyond the current opt-in proposal to enable Washington and the aviation industry to achieve their respective climate goals, as there is broad consensus that availability of AJF in significant quantities is critical to enabling decarbonization of the aviation sector. Specifically, we urge WA DOE to consider additional regulatory provisions, including a credit multiplier, in recognition of AJF's additional climate and air quality benefits

The WA LCFS is an Opportunity for WA to be a Leader in AJF Commercialization Efforts

LanzaJet recognizes and appreciates the state's desire to be a leader in AJF usage and AJF commercialization efforts to support the aviation industry and reduce transportation emissions by 20% by 2038. Our history started with the collaboration with the U.S. Department of Energy's Pacific Northwest National Laboratory (PNNL) to scale the alcohol-to-jet (ATJ) process. Beyond reducing CO₂

¹ LanzaJet was launched in 2020 following a decade of technology development and scale-up and is focused on producing SAF from low carbon, sustainable ethanol via the alcohol-to-jet process. The LanzaJet process can use any source of sustainable ethanol for jet fuel production, including, but not limited to, ethanol made from recycled pollution, the core application of LanzaTech's carbon recycling technology. LanzaJet's mission is to scale the SAF market and enable decarbonization of the aviation sector. LanzaJet's equity investors include LanzaTech, Suncor, Mitsui, Shell and British Airways. LanzaJet is currently developing its first commercial-scale facility in Soperton, Georgia, and is actively pursuing SAF projects throughout the world. LanzaJet has a goal of 1 billion gallons of domestic production by 2030.



emissions on a lifecycle basis, this is also an opportunity to reduce non-CO2 emissions related to aviation as AJF is proven to reduce both sulfur and particulate emissions, which benefits the communities that surround airports. However, more needs to be done in order to further advance AJF production and ensure aviation targets are met. At a minimum, LanzaJet suggests a provision be added to the rule to revisit the opt-in exemption for aviation fuels and examine options for including aviation under the Clean Fuels Program. Specifically, we suggest that a new section be added to WAC 173-424-130 (3) to read as follows: **“(c) Opt-in fuels related to aviation and other hard to decarbonize industries will be reviewed for inclusion on a biennial basis.”**

While a voluntary opt-in for AJF should be considered as a regulatory floor, experience with U.S. renewable fuels policies demonstrates that an opt-in itself (absent other incentives) is insufficient to drive the scale required to significantly reduce aviation emissions, as the lack of an obligation for jet fuel also contributes to lower prices for fossil jet fuel as compared to obligated fuels like diesel, making it less advantageous for fuel producers to offer low carbon replacements for those fuels.² Despite having an opt-in since 2010 under the U.S. RFS and since January 1, 2019, under the California LCFS (and subsequently the Oregon LCFS), EPA data demonstrates that roughly 5 million gallons of AJF was used in the U.S. last year, as compared to over 1.3 billion gallons for similar renewable diesel fuel.³ While this can be partially attributed to the more nascent state of the AJF industry, this is also an artifact of current policies, including state LCFS policies, that are less advantageous for AJF. An opt-in alone, while preferable to an outright exclusion for all aviation fuels, still creates a structural disadvantage for AJF. Thus, while an opt-in provides value for AJF producers, disparate regulatory treatment can be expected to result in much lower volumes than could otherwise be produced. Simply put, lack of significant volumes of AJF today should not be misinterpreted as a signal that the market is insufficiently mature to support an obligation for aviation, but rather should be interpreted as evidence of significant policy disincentives for AJF. We note that the California Air Resources Board has recently considered including aviation fuels under the LCFS, at least for intrastate aviation.⁴ Further, British Columbia is currently considering including an obligation for aviation fuels in their LCFS program.⁵

As a leading aviation state, we encourage WA DOE to examine the full breadth of its authority to incentivize the development of a new AJF/SAF industry. Absent an aviation obligation, we urge WA DOE to consider other incentives such as the credit multiplier outlined below, in recognition of the unique circumstances facing aviation and the added benefits that AJF/SAF provide. This will ensure that producers will keep Washington at the top of list for investment and will help enable achievement of the aviation industry’s goal of three billion gallons of AJF by 2030 and net zero emissions by 2050.

² See, e.g., Knittel et. Al, The Pass-Through of RIN Prices to Wholesale and Retail Fuels under the Renewable Fuel Standard (finding that the cost of renewable fuel obligations as passed on to obligated fuels but not fuels like jet fuel not subject to the RFS); *available at*

<https://dspace.mit.edu/bitstream/handle/1721.1/120581/w21343.pdf?sequence=1&isAllowed=y>

³ See <https://ethanolproducer.com/articles/18935/epa-19-86-billion-rins-generated-under-the-rfs-in-2021>

⁴ See https://ww2.arb.ca.gov/sites/default/files/2021-12/LCFS%2012_7%20Workshop%20Presentation.pdf

(proposing to include intrastate jet fuel as required fuel). We encourage WA DOE to undertake a full analysis of the extent of its authority to incentivize development of the AJF industry.

⁵ See https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf



Tier 2 Pathway Applications for AJF

During the hearing on August 23, 2022, WA DOE stated that the Tier 2 Pathway applications will not be reviewed until July of 2025 due to staffing. We appreciate that WA DOE will rely on CA and OR models but believe that in order move as fast as the AJF industry, WA should reconsider and start accepting Tier 2 pathway applications at a much earlier date. LanzaJet suggests the following modification to draft regulatory language (Part 6, (5)(b):

(b) Tier 2. Except CARB or OR-DEQ certified fuel pathways as provided in subsection (3) of this section that, ecology will ~~not~~ start accepting Tier 2 applications ~~until~~ *no later than July 1, 2025, or at an earlier date in which WA DOE will provide 30 days notice*. Tier 2 includes all fuels not included in Tier 1 including, but not limited to:

This will provide WA DOE the opportunity to ensure further development of the WA Clean Fuels Program related to AJF and allow for more innovative technologies without a two-year delay.

Provide a Credit Multiplier for AJF from Program Start

Absent an obligation for aviation, WA DOE should consider complementing opt-in eligibility with a credit multiplier for AJF to drive scale in the industry. Such an approach would be justified because of the higher need for AJF in the hard to decarbonize aviation industry, and in recognition of AJF's significant air quality and non-CO2 climate benefits. On air quality, a recent synthesis of emissions measurement campaigns sponsored by the U.S. National Academies of Sciences found that a 50% AJF blend could reduce particulate emissions by up to 65% and oxides of sulfur by nearly 40%.⁶ A more recent measurement campaign found that AJF produced via the alcohol-to-jet pathway could reduce non-volatile particulate matter by up to 97%.⁷ These conventional emissions reductions are substantial and can be specifically targeted at communities adjacent to airports that have historically been disproportionately burdened with pollution.

In addition to local air quality benefits, emerging research also indicates that particulate matter reductions from AJF also reduce aviation's non-CO2 climate impact, specifically the climate forcing from "contrail cirrus" impacts (the combined warming from contrails and contrail-induced cirrus). The current best estimate from the most recent comprehensive study is that the climate impact from contrail cirrus is nearly twice the impact from CO₂.⁸ Even the low end of current estimates—which show that contrail cirrus causes roughly half the total warming of CO₂—warrants consideration of potential mitigation opportunities from AJF.⁹ One recent study cited found that a 50% AJF blend would reduce contrail cirrus climate impacts by over 20%. An eventual shift to 100% AJF would reduce the climate impact of contrail cirrus by 50%.¹⁰

⁶ See <http://www.trb.org/Publications/Blurbs/179509.aspx>

⁷ See <https://pubs.acs.org/doi/abs/10.1021/acs.energyfuels.0c00260>

⁸ See Lee et al, The Contribution of Global Aviation to Anthropogenic Climate Forcing for 2000 to 2018, *available at* <https://www.sciencedirect.com/science/article/pii/S1352231020305689>

⁹ *Id.*

¹⁰ See European Union Aviation Safety Agency, Updated Analysis of the non-CO2 Climate Impacts of Aviation and the Potential Policy Measures Pursuant to EU Emissions Trading System Directive Article 30(4) (synthesizing research on SAF non-CO2 climate benefits and suggesting further consideration of SAF policy measures to mitigate



The European RED II program currently provides a multiplier of 1.2x for AJF, though that is widely considered insufficient to drive AJF scale-up, and the U.S. House Select Committee on the Climate Crisis recently recommended that Congress provide a credit multiplier for AJF under the Renewable Fuel Standard in order to provide additional market certainty and financial incentive to scale up AJF production.¹¹ Because AJF offers additional air quality and climate benefits not currently recognized by existing policies, we urge WA DOE to similarly consider a credit multiplier for AJF of 1.5x, or another level that is commensurate with the additional climate benefits AJF provides as compared to ground transportation fuels.

Conclusion

LanzaJet appreciates the opportunity to comment on the Washington Clean Fuels Program WAC 173-424 and looks forward to working together to continue providing solutions to reduce aviation's impact on the environment. We are encouraged that rule includes AJF's eligibility to generate credits from the start of the program at parity with renewable diesel and believe a credit multiplier for AJF and a biennial review of aviation's opt-in status are critical to the success of the rule.

Sincerely,

A handwritten signature in cursive script that reads "Alex Menotti".

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A handwritten signature in cursive script that reads "M. M. Csaky".

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aviation climate impacts); *available at* https://www.easa.europa.eu/sites/default/files/dfu/201119_report_com_ep_council_updated_analysis_non_co2_climate_impacts_aviation.pdf

¹¹ See Solving the Climate Crisis, the Congressional Action Plan for a Clean Energy Economy and Healthy, Resilient, and Just America, *available at* <https://climatecrisis.house.gov/report>