

To: Steven Cliff, Executive Officer, Air Resources Board  
From: Jeremy Martin  
Date: December 13, 2023  
Subject: Tier 2 Pathway Application No. B0520 and PHILLIPS 66 COMPANY (4528); California

Pathway application number B0520 from Phillips 66 company includes a very consequential proposal to treat soybean oil imported by tanker from South America using the same land use change (LUC) analysis that was previously developed for soybeans grown in the US Midwest. This proposal is not technically sound, and the Executive Office should instead perform a new LUC analysis using the GTAP-Bio model combined with the AEZ-EF model with inputs appropriate to the specifics of this application to more accurately assess the LUC impact of the proposed pathway. Beyond the lifecycle analysis question, the fact that Phillips 66 feels compelled to look to South America for feedstock is indicative of the need for more comprehensive LCFS reform in the forthcoming rulemaking.

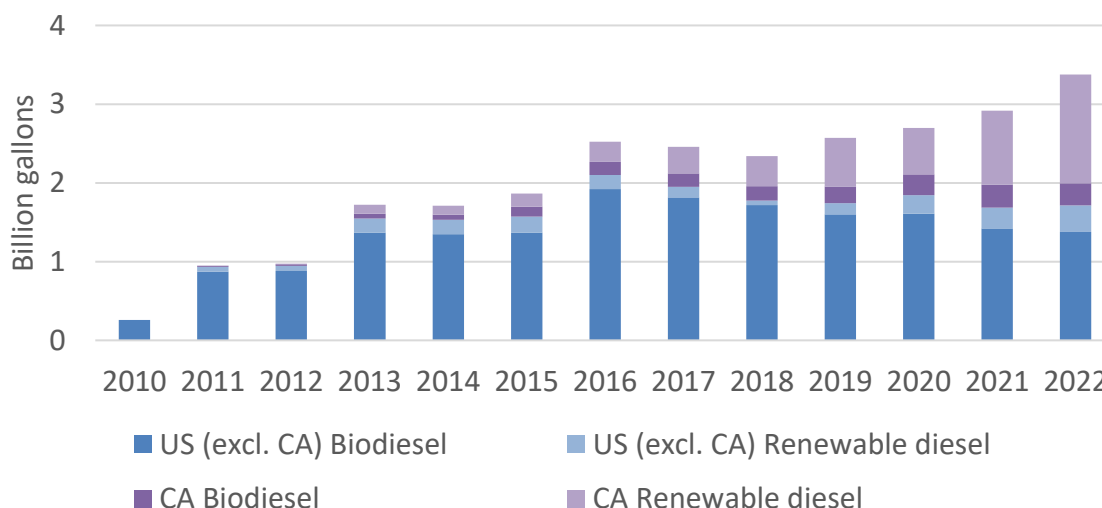
The application mentions only a few parameters of the many that differ between Argentina and the US Midwest. The parameters cited are those that tend to suggest a lower LUC score, but there are other differences between the proposed pathway and the US soybean oil LUC assessment that suggest the impact may be higher than the LUC assigned to US soybean oil. In modeling for the International Civil Aviation Organization (ICAO), soybean oil from Brazil was assessed an induced land use change value 10 percent higher than soybean oil from the US<sup>i</sup>.

Argentina is the world's leading exporter of soybean oil, exporting 4.1 million metric tons (MMT) of vegetable oil in 2022/23 marketing year<sup>ii</sup>. India is by far the largest importer of both soybean oil and palm oil. Palm oil accounts for more than half of global vegetable oil trade. By competing for soybean oil imports with Indian consumers who currently consume soybean oil for food, Phillips 66 is likely to encourage a shift in Indian food consumption in favor of palm oil, which already makes up 37 percent of India's domestic vegetable oil consumption<sup>iii</sup>. The GTAP model uses Armington elasticities that take into consideration the specific trade flows in each region. These should capture the more direct link between palm oil expansion and Argentine soybean oil diverted from export markets for renewable diesel production in California compared to midwestern soybean oil.

The other important factor relevant to the land use impact assessment is the unprecedented scale of feedstock consumption associated with the Phillips 66 Rodeo refinery and the broader capacity expansion underway in the renewable diesel industry. As shown in the figure below, California consumption of renewable diesel has accounted for all growth in US biobased diesel fuel use since 2016. California now accounts for more than half of US bio-based diesel consumption. US bio-based diesel consumption requires feedstock of approximately 12 MMT of vegetable oils and fats<sup>iv</sup>. By comparison, total US production of all oils and fats in 2022 was less than 18 MMT. Thus, California fuel bio-based diesel consumption is equivalent to one third of total US feedstock production, even before the Phillips 66 Rodeo and Marathon Martinez Facilities are operating at capacity.

The 800 million gallon per year capacity of the Rodeo refinery will consume almost 3 MMT of vegetable oil. This is roughly a quarter of the total global trade in soybean oil in recent years. The scale of feedstock utilization associated with the Rodeo facility combined with the Marathon Martinez facility and the recent expansion of other facilities<sup>v</sup> are putting pressure on vegetable oil feedstocks at a level vastly higher than the modeled shock used to develop the LUC factors. LUC modelling for this pathway should include a shock commensurate with the demand from the Rodeo facility and a background that reflects current and announced sources of demand for vegetable oil.

Bio-based diesel consumed in California and the United States (CARB and EIA data)



The ongoing expansion of soybean oil based renewable diesel underway in California and elsewhere to serve the California market is dramatically undercutting the environmental outcomes of the LCFS and deserve a policy response that goes beyond an updated LUC change assessment. A safeguard that caps the use of lipid-based fuels at a sustainable level is required to ensure that California's climate policy is not creating harmful food price impacts or contributing to deforestation. But this is a matter for the forthcoming LCFS rulemaking process. While this rulemaking process is underway, it would be highly improper to lock in a pathway that will dramatically impact global vegetable oil markets through a pathway approval process that does not properly assess the LUC impact of the proposed pathway.

<sup>i</sup> International Civil Aviation Organization. 2022. CORSIA Default Life Cycle Emissions Values For CORSIA Eligible Fuels. [Link](#)

<sup>ii</sup> Foreign Agricultural Service/USDA. 16 November 2023. Oilseeds: World Markets and Trade. [Link](#)

<sup>iii</sup> Ibid

<sup>iv</sup> Feedstock estimates assume 7.55 pounds of feedstock per gallon for biodiesel and 8.125 pounds per gallon for renewable diesel, consistent with [Gerweni, Irwin, and Hubbs](#). Actual values will vary by feedstock, conversion process and facility, but this should be pretty close.

<sup>v</sup> Gerweni, M., T. Hubbs and S. Irwin. "[Overview of the Production Capacity of U.S. Renewable Diesel Plants for 2023 and Beyond](#)." *farmdoc daily* (13):57, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, March 29, 2023. [Permalink](#)