May 26, 2015

Air and Radiation Docket
Docket No. EPA–HQ–OAR–2015–0093
Environmental Protection Agency
Mailcode: 28221T
1200 Pennsylvania Ave. NW.
Washington, DC 20460.
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Re: Docket No. EPA–HQ–OAR–2015–0093: Notice of Opportunity to Comment of an Analysis of the Greenhouse Gas Emissions Attributable to Production and Transport of Brassica Carinata Oil for Use in Biofuel Production, 80 Fed. Reg. 22996 (April 24, 2015).

To Whom It May Concern:

The Clean Air Task Force (CATF) appreciates the opportunity to comment on the Environmental Protection Agency's analysis of whether biofuels produced from *Brassica carinata* (carinata) oil qualify as "advanced biofuels" according to the criteria established by Section 211(o) of the Clean Air Act and the regulations implementing the Renewable Fuel Standard (RFS).

CATF is a non-profit environmental organization that works to protect the earth's atmosphere by improving air quality and reducing global climate change through scientific research, public advocacy, technological innovation, and private sector collaboration. Consistent with this mission, CATF works to help EPA and other regulatory agencies ensure that biofuels and the policies that promote the use of bioenergy contribute to—rather than undermine—broader efforts to mitigate global climate change.[1]

These comments focus on several areas of EPA's Notice of Opportunity to Comment (referred to hereinafter as EPA's "proposal," "proposed ruling," or proposed determination") where aspects of the Agency's lifecycle greenhouse gas (GHG) emissions analysis for carinata are not adequately addressed or explained. First, it is not clear that some of the key comparisons that EPA makes between carinata and other biofuel feedstocks are warranted, calling into question EPA's reliance in this proposal on the

[1] For more information about CATF's efforts in this area, please see http://www.catf.us/climate/land_use_and_bioenergy/biofuels/

findings it made while analyzing other feedstocks. Second, the proposal lacks adequate justification for its assumptions about how, when, and where carinata production is most likely to expand. Third, EPA does not explain a key assumption affecting its emissions analysis for carinata—*i.e.*, that carinata production involves significantly less fuel consumption than soybean production.

Background

When it passed the Energy Independence and Security Act of 2007, Congress drastically expanded the size of the RFS mandate, in part by establishing aggressive annual mandates for "advanced biofuels." To date, however, the RFS has largely amounted to a mandate for corn ethanol, a fuel that negatively impacts climate change, water quality, wildlife habitat, and international food security. Corn ethanol has accounted for almost 90% of the fuel by volume that has been produced under the RFS during 2010-2014.

The RFS will not contribute meaningfully to climate change mitigation until the policy supplies consumers with less corn ethanol and and more "advanced biofuels," the statutory term for biofuels that have lifecycle GHG emissions that are at least 50% less than those from petroleum-based fuels.[2] The commercial deployment of "advanced biofuels," especially those made from cellulosic material, has been slow, due to a combination of economic and technological complications. To the extent such fuels become available, EPA is charged with determining whether biofuels meet the 50% reduction threshold, and the Agency developed a process for streamlining its analysis of new "advanced biofuel" pathways.[3]

Under EPA's proposed determination, fuel made from carinata, an oilseed crop also known as Ethiopian mustard, would qualify as an "advanced biofuel" provided that "typical fuel production process technology conditions are used."[4] The proposed carinata determination relies heavily on findings that EPA made in its previous analyses of other oilseed feedstocks.[5]

EPA's Decision to Forgo Lifecycle GHG Modeling for Carinata

Instead of modeling the lifecycle GHG emissions attributable to biofuels made from carinata oil, EPA's proposal to approve carinata-based fuels as "advanced biofuels" under the RFS

[2] 42 U.S.C. §7545(o)(1)(B), CAA §211(o)(1)(B).
[3] *See* EPA, *Improving the Petition Process for New Renewable Fuel Pathways* (March 2014) (http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f14011.pdf)
[4] 80 Fed. Reg. 22996, 22996/2 (April 24, 2015).
[5] *Id*. at 22997/2-3.

focuses on the similarities between carinata oil production and the production of soybean oil and camelina oil. Having previously found that the lifecycle GHG emissions attributable to soybean oil-based biofuel are at least 50% lower than those from petroleum-based diesel[6] and that "the GHG emissions performance of camelina-based fuels is at least as good as that modeled for fuels made from soybean oil,"[7] EPA determined that "new agricultural sector modeling is not needed to evaluate the lifecycle GHG impact of using carinata oil as a biofuel feedstock for the purpose of making GHG threshold determinations for the RFS program." Consequently, rather than conduct a lifecycle emissions model for carinata-based fuels, EPA "propose[s] to evaluate the agricultural sector GHG emissions of using carinata oil … by assuming that GHG emissions are similar to those associated with use of soybean oil for biofuel production."[8]

Based on the information presented in EPA's proposal, however, it is not clear that soybean production is an appropriate analogue for carinata production, or that EPA's assumption "that GHG emissions [attributable to carinata production] are similar to those associated with use of soybean oil for biofuel production" is warranted. As discussed in more detail below, there are important differences between soybean production and carinata production, particularly in terms of land use change impacts and production inputs. Some of the key differences—*e.g.*, the discrepancy in fuel inputs—are not explained in EPA's proposal.[9] Other differences—*e.g.*, the supposedly counteracting emissions associated with feedstock collection—are addressed in a fairly cursory, non-qualitative fashion.[10]

EPA seeks comment on its proposal to assess biofuels made from carinata based on their similarity to fuels made from soybeans and camelina.[11] CATF understands the rationale behind EPA's decision to forego actual lifecycle modeling of carinata-based fuels, especially in light of the current backlog of pathway petitions. CATF is concerned, however, that proposal does not provide the public with an adequate statement of the "basis and purpose" for EPA's decision,[12] due to EPA's reliance on comparisons of debatable relevance instead

[6] 75 Fed. Reg. 14670, 14789-790 (March 26, 2010).
[7] 80 Fed. Reg. at 22997/2.
[8] *Id*. at 22997/3.
[9] The discrepancy in fuel inputs is discussed below, in the section of these comments on "Assumed Fuel Inputs for Carinata Production."
[10] EPA's determination that "GHG emissions from feedstock distribution will be the same for carinata as such emissions for soybeans" is based on a highly simplified comparison of the relative energy requirements for two steps in the process of transporting carinata and soybeans to crushing facilities. Carinata contains more oil per pound than soybean, so the energy required to transport enough carinata to needed to make a gallon of oil is lower on a per mile basis. EPA expects that carinata cultivation will be dispersed, though, so travel distances to crushing facilities will be longer. The proposal does not include data that could be used to substantiate EPA's conclusion that these factors cancel each other out. *Id*. at 23002/2.
[11] *Id*. at 22997/3, 23002/3.
[12] 42 U.S.C. §7607(d)(3), CAA §307(d)(3) ("[N]otice of proposed rulemaking … shall be accompanied by a statement of its basis and purposes … The statement of basis and purpose shall include a summary of—(A) the factual data on which the proposed rule is based ….").

of lifecycle emissions models, as well as the proposal's failure to sufficiently examine and describe key characteristics of carinata production.

Analysis of Carinata's Land Use Change Impacts

EPA's analysis of carinata-based biofuels' potential land use change impact—often a key factor in the lifecycle GHG emissions of biofuels—is insufficient, because the Agency has not explained why the particular production scenario it envisions is likely to occur.

In its description of carinata production's impact on land use, EPA writes, "Carinata will most like be grown in the U.S. and Canada in semi-arid, marginal land, as an off-season winter cover crop in the southeastern U.S., or on dryland wheat acres during the period that they would otherwise be left fallow."[13] In drier wheat growing regions where fields are left fallow every few years, EPA writes that "[c]urrent research indicates that carinata could be introduced into this rotation in certain areas in lieu of fallowing without adversely impacting moisture or nutrient accumulation."[14]

Ryan Stockwell, an agricultural expert for the National Wildlife Federation, questions EPA's assumption that carinata is likely to be grown in commercially relevant volumes on northern US and Canadian wheat fields. Carinata, like other *Brassica* species, can consume a significant amount of a field's soil moisture, so cultivating carinata either during the winter or during fallow years could negatively impact a farm's wheat productivity—particularly on farms in the western portion of the wheat range. Furthermore, Dr. Stockwell doubts that carinata is likely to thrive if it is planted on wheat fields during the winter, due to the shortness of the growing degree-days at the latitudes where wheat is typically grown. Assuming US carinata production were to expand significantly, the most likely scenarios are that the expansion would occur in the Southeast (where carinata would be grown as a winter cover crop on cotton fields) or in the northern Great Plains as a summer crop.[15]

EPA does not analyze the land use change impact that would occur if carinata were grown as a cover crop in the Southeast or as summer crop in the northern Great Plains, however. Instead, the Agency bases its assessment of carinata-based biofuels' land use change impact on its "expect[ation] that carinata will primarily be grown in rotation with wheat."[16] CATF (and others) cannot determine the reasonableness of EPA's expectation, because the regulatory record does not provide an economic rationale for the Agency's assumption that most carinata will be grown in rotation with wheat.

[13] *Id*. at 22998/2.
[14] *Id*. at 22998/3.
[15] Phone conversation between Ryan Stockwell of National Wildlife Federation and Jonathan Lewis of Clean Air Task Force (May 21, 2015).
[16] *Id*. at 22999/1.

CATF raised a similar concern in our comments about EPA's lifecycle GHG assessment for camelina-based biofuels.[17] As we said in that context, EPA must provide a more robust and better-substantiated analysis of *likely* production practices. When analyzing the environmental consequences of increased production of carinata, it is not enough for the Agency to focus on particular way that the crop *might* be grown. The fact that it may be physically possible to grow carinata in rotation with wheat says nothing about whether that approach is the most economically efficient option available to farmers – particularly when production is scaled up to commercially relevant volumes. Growing practices will be determined largely according to a variety of economic factors, such as input costs, crop productivity, and commodity prices. In its proposal, EPA failed to provide factual data that show how those economic factors will shape production practices, nor has it described the methodology it would use to analyze such data. Consequently, EPA has not provided an adequate basis for its assessment that an increase in biofuels-related production of carinata will not result in a significant increase in land use change-related GHG emissions.[18]

Before making a final determination about whether carinata-based biofuels qualify as "advanced biofuels" under the RFS, EPA must demonstrate that it has assessed the land use change impacts associated with the production expansion scenarios that are the most likely to occur. EPA has not yet demonstrated that growing carinata in rotation with wheat is the most likely future production scenario in the event that carinata is grown to produce biofuels. Until it conducts such an analysis, EPA has not "gather[ed] sufficient information on which to inform its decision of whether proposed biofuels qualify under the program in terms of lifecycle GHG emissions reduction."[19]

Assumed Fuel Inputs for Carinata Production

EPA presents data to support its determination that the GHG emissions from cultivation and transportation of carinata oil are similar to those for soybean oil, but the Agency has not explained key discrepancies among the data it uses. EPA writes:

> Based on our comparison of carinata oil to soybean oil, EPA proposes to use, in its future evaluations of petitions seeking to use carinata oil as a feedstock for biofuel production, an estimate of the GHG emissions associated with the cultivation and transport of carinata oil that is the same as that which we have used for soybean oil, on a per ton of oil basis.[20]

The comparison EPA refers to is summarized in Table 3 of the proposal:

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[17] *See* CATF *et al*, Comments on Proposed and Direct Final Rules for 'Regulation of Fuels and Fuel Additives: Identification of Additional Qualifying Renewable Fuel Pathways Under the RFS Program' (submitted February 6, 2012) at 2 (http://www.catf.us/resources/filings/biofuels/20120206-EPA%20Comments%20on%20Biofuels%20Pathways.pdf).

[18] *Cf.* CAA §307(d)(3), 42 U.S.C.A. § 7607(d)(3).

[19] *Id*. at 23002/2.

[20] *Id*. at 23002/2-3.

TABLE 3—INPUTS FOR CARINATA AND SOYBEAN PRODUCTION FOR PROJECTED 2022 YIELDS[28]

	Carinata		Soybeans (varies by region)	
	Inputs (per acre)	Emissions (per ton carinata oil)	Inputs (per acre)	Emissions (per ton soybean oil)
N20	N/A	584–869 kg CO_2eq	N/A	449.0–661.1 kg CO_2eq.
Nitrogen Fertilizer	40–80 lbs	160–321 kg CO_2eq	3.5–8.2 lbs	23.2–79.1 kg CO_2eq.
Phosphorus Fertilizer	15–30 lbs	21–41 kg CO_2eq	5.4–21.4 lbs	13.5–64.8 kg CO_2eq.
Potassium Fertilizer	0–10 lbs	0–9 kg CO_2eq	3.1–24.3 lbs	5.3–48.5 kg CO_2eq.
Herbicide	2.75–2.75 lbs	79–79 kg CO_2eq	0.0–1.3 lbs	2.4–69.6 kg CO_2eq.
Pesticide	0–0 lbs	0–0 kg CO_2eq	0.1–0.8 lbs	12.4–50.2 kg CO_2eq.
Diesel	3.5–3.5 gal	107–107.1 kg CO_2eq	3.8–8.9 gal	227.9–622.3 kg CO_2eq.
Gasoline	0–0 gal	0–0 kg CO_2eq	1.6–3.0 gal	93–151.4 kg CO_2eq
Total		950–1426 kg CO_2eq		961–1443 kg CO_2eq.

The conclusion that EPA draws from these data is that the net cultivation and transport emissions are essentially equal for carinata and soybeans. That conclusion depends heavily on the comparatively low fuel input data that EPA uses for carinata, however. EPA assumes that the process of producing carinata consumes 3.5 gallons of diesel fuel and 0.0 gallons of gasoline per acre, resulting in 107.1 kg CO_2e emissions per ton of oil produced. EPA assumes that producing soybeans consumes 3.8-8.9 gallons of diesel fuel and 1.6-3.0 gallons of gasoline per acre, resulting in a combined total of 320.9-773.7 kg CO_2e emissions per ton of oil produced. In other words, EPA data indicate that fuel-related GHG emissions during planting and harvesting are two to seven times higher for soybeans than carinata. If, for the sake of argument, the fuel-related emissions for carinata production were equal to those for soybean production, the total emissions for carinata production would grow to 1163.9-2092.7 kg CO_2e per ton of oil produced—a range of values that is substantially higher (22-45% higher) than what EPA attributes to soybeans.

EPA has made similarly low assumptions about the volume of diesel and gasoline used to produce other oilseed feedstocks,[21] but to CATF's knowledge the Agency has not yet explained its rationale for doing so, or why fuel consumption (and resulting GHG emissions) is so much lower for carinata, camelina, and pennycress oils than for soybean oil. Before it finalizes its determination about whether carinata-based biofuels qualify as "advanced biofuels" under the RFS, EPA should explain the fuel use data in Table 3.

Conclusion

CATF appreciates the opportunity to comment on EPA's analysis of the GHG emissions attributable to the production and transport of carinata oil for use in biofuel production.

[21] In 2012, EPA determined that cultivating camelina for the purpose of producing biofuel would require 3.5 gallons diesel per acre and zero gallons of gasoline per acre. 77 Fed. Reg. 700, 706 (January 5, 2012) (Table 2). In 2015, the Agency proposed to determine that pennycress cultivation would require 1 gallon of diesel per acre and zero gallons of gasoline per acre. 80 Fed. Reg. 15002, 15006 (March 20, 2015) (Table 3). In an accompanying footnote, EPA wrote, "Diesel and gasoline are used for planting and harvesting pennycress[,]" even though Table 3 of the pennycress proposal shows zero gasoline consumption. *Id*. at 15005 n.25.

We support EPA's effort to improve the environmental performance of the RFS by approving new pathways by which feedstocks—particularly those that do not compete for existing farmland—can be used to produce "advanced biofuels." Furthermore, we understand the Agency's interest in efficiently addressing its backlog of pathway approval petitions.

Several aspects of the proposed carinata determination deserve closer analysis and/or fuller explanation, however. Before finalizing its assessment of the lifecycle GHG emissions associated with biofuels made from carinata oil, EPA must explain and justify (1) the key comparisons it makes between carinata and other oilseed crops, especially where perceived similarities between the crops contributed to the Agency's decision to forego lifecycle GHG modeling for carinata; (2) its assumptions about how, when, and where carinata cultivation will expand in the United States; and (3) its assumptions about the amount of fuel used to produce carinata.

Please do not hesitate to contact CATF with any questions about these comments.

Respectfully submitted,

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